
Cabling common equipment

This procedure does not apply to single CPU systems (options 21A, 21, 21E, 51 and 51C).

Use the following guidelines for routing common equipment cables:

- When routing SBE or CNI to 3PE cables, store any excess cable length near the associated Network Module. Do not store excess cable in a CPU or Core/Net Module.
- When routing DIGS to intergroup cables, store excess length near the InterGroup Module.

Because the cable troughs and spaces on the sides of a module are within the EMI shielding of the system, unshielded cables can be routed in those areas. As space permits, common equipment cables can be routed:

- horizontally in the cable troughs at the front, rear, and sides of the module

Note: In a DC-powered module, because there is no MPDU, there is room to route cables horizontally from front to rear on the left side (front view) of the module.

- vertically on the sides of the module

CAUTION

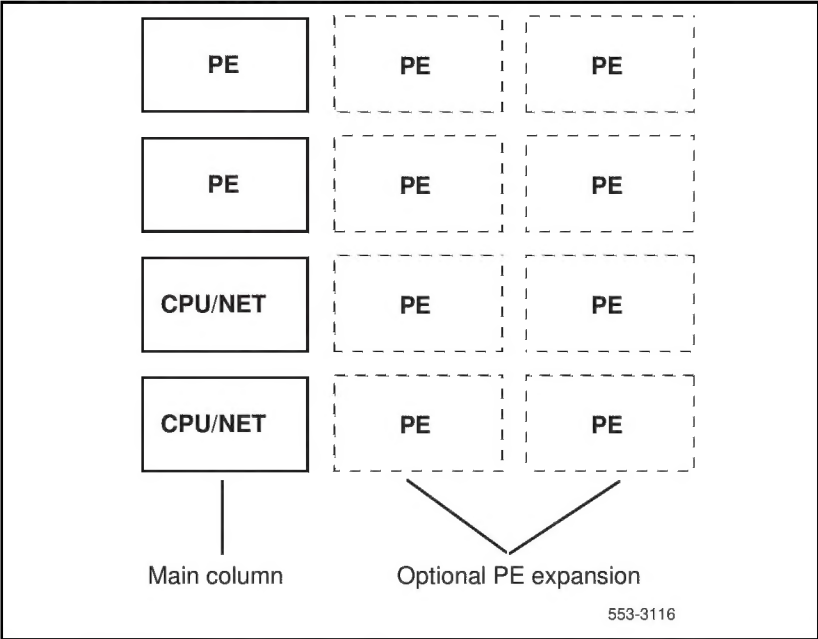
Cables must be routed as perpendicular as possible to any nearby power cables. Avoid routing cables near power cables if alternate routing is available. (At the rear of the module, cables routed between the I/O panel and the rear cover can be parallel to the power cables because the panel provides EMI shielding.)

System option 61

Option 61 is a dual CPU system with standby processing capability, fully redundant memory, and a full network group. Two CPU/Network Modules and one IPE Module are required. Additional IPE Modules, PE Modules, RPE Modules, and application modules can be used.

Figure 65 shows a basic configuration.

Figure 65
Option 61 dual CPU, full network group configuration



Cable installation

- 1 Connect the NTND10 Changeover and Memory Arbitrator (CMA) Card (QPC581 before X11 release 18) in CPU/Network 0 to the CMA card in CPU/Network 1:
 - Connect J2 to J2 with an NT8D80BD cable.
 - Connect J1 to J1 with an NT8D85BZ cable.
 - [Figure 66](#) shows the CMA card position in the NT6D39 CPU/Network Module and the cables required.
- 2 Connect the QPC441 3-Port Extender (3PE) Card in CPU/Network 0 to the 3PE card in CPU/Network 1:
 - Connect J3 to J3 with an NT8D80BD cable.
 - Connect J4 to J4 with another NT8D80BD cable.
 - [Figure 66](#) shows the 3PE card position in the NT6D39 CPU/Network Module and the cables required.
- 3 Connect network half-group 0 in CPU/Network 0 to half-group 1 in CPU/Network 1:
 - Cable the D connectors (on the rear of the backplane) together with an NT8D99AB cable.
 - Cable the E connectors (on the rear of the backplane) together with another NT8D99AB cable.

Note: NT8D99 cables are installed in Options 61, 61C, 71, 81, and 81C before the systems are shipped.

 - [Figure 67](#) shows the D and E connectors on the backplane of the NT6D39 CPU/Network Module and the cables required.
- 4 If clock controller cards are equipped, cable the faceplate connectors together with an NT8D75AD cable.
- 5 Seat and secure all connectors.

Figure 66
NT6D39 CPU/Network Module (front view)—CMA and 3PE cables

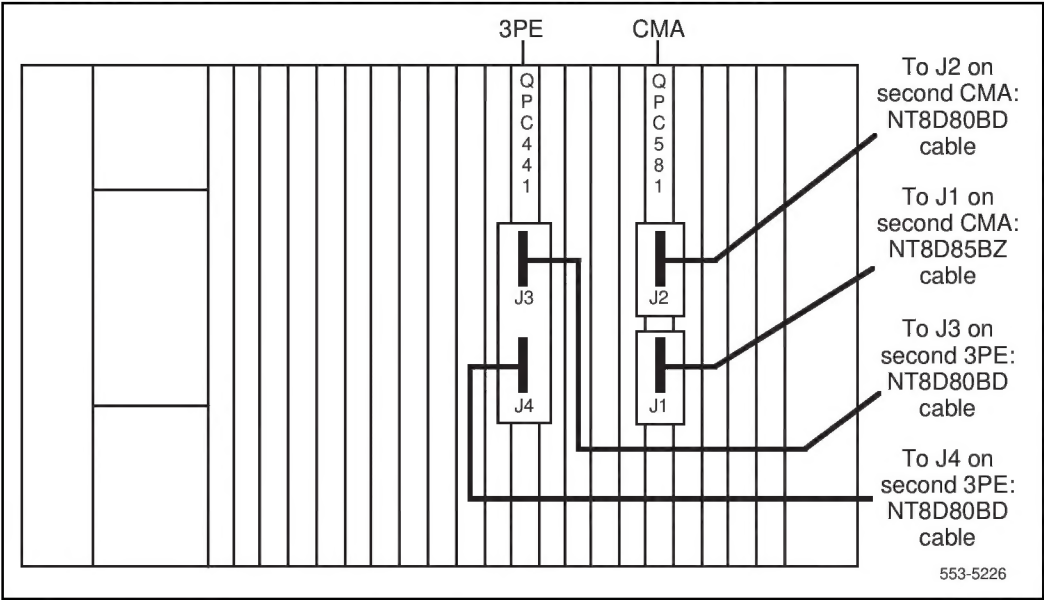
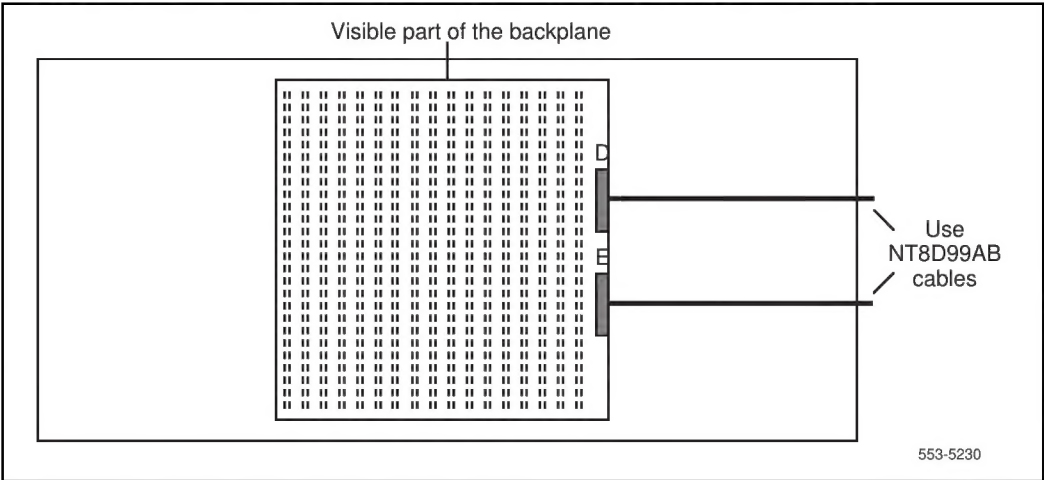


Figure 67
NT6D39 CPU/Network Module (rear view)—location of D and E connectors

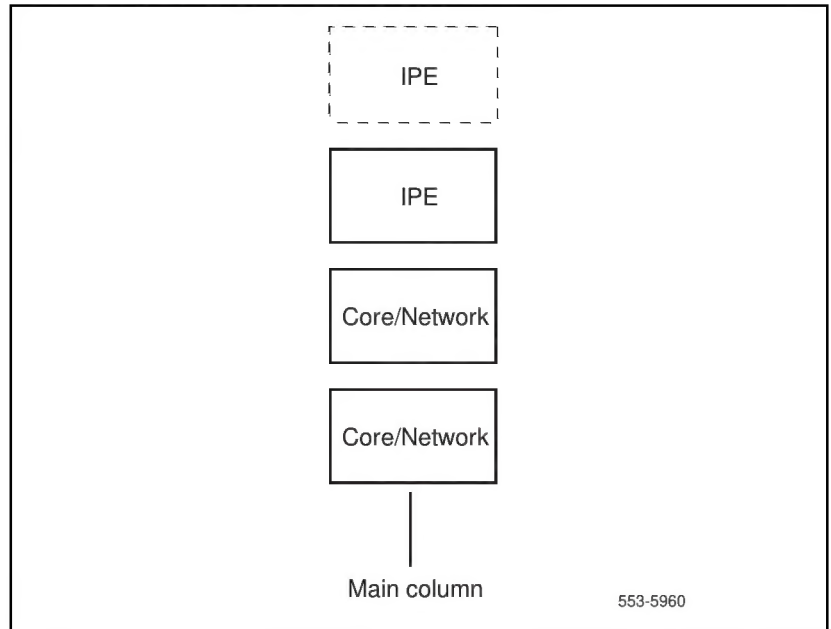


System option 61C

Option 61C is a dual CPU system with standby processing capability, fully redundant memory, and a full network group. Two Core/Net Modules and one IPE Module are required. Additional IPE Modules, PE Modules, RPE Modules, and application modules can be used.

[Figure 68](#) shows a basic configuration.

Figure 68
Option 61C dual CPU, full network group



CNI configuration

In the NT5D21 Core/Net Module, port 0 on the NT6D65 Core to Network Interface (CNI) Card in slot 12 must be configured as “group 0.”

Communication between the CNI and 3PE cards for group 0 is accomplished through the backplane; no cable is required.

Since only one network group is supported in option 61C, only one CNI card is required. The CNI card must be installed in slot 12 in the Core/Net Module, and Port 0 is dedicated to “group 0.”

Cable installation guidelines

Core/Net module backplanes, like all circuit boards, have a primary side and a secondary side. The primary side, which faces the front of the module, contains the primary shrouds, which provide mechanical guidance for the pins of the card edge connectors. The secondary side of the backplane, which faces the rear of the module, contains the secondary shrouds, which provide mechanical guidance for cable connectors.

The columns of secondary backplane shrouds are designated 18 through 12 from left to right (facing the rear of the backplane). This numbering matches the card slots in the front of the module. The connector rows of secondary backplane shrouds are designated A through F from top to bottom.

Before you connect cables to the backplane, visually inspect the backplane shroud connectors to make sure there are no bent pins. To connect cables:

- 1** Orient the cable connector so the strain relief paddle is to the right.
- 2** Partially insert the cable connector so its guides mate to the corresponding backplane connector.
- 3** Apply a small amount of pressure to push the cable connector straight into the backplane connector. You will feel a detent click when the connector seats.

CAUTION

Pins may be bent or broken if you try to insert the cable connector at an angle. Do not push the connector in any further after you hear the detent click.

Using the cable extraction tool

To disconnect cables from the Core/Net Module backplane, you will be required to use the P0741489 Extraction Tool provided, located in the rear of the module (behind the I/O safety panel).

CAUTION

You must use the extraction tool to disconnect cables from the backplane in NT5D21 Core/Net Modules to avoid bending or breaking backplane pins. Do not improvise with common hand tools.

CAUTION

You must use the P0741489 Extraction Tool to disconnect cables from the backplane shrouds in NT9D11 Core/Network Modules.

Follow the procedure below to avoid bending or breaking pins when removing cable connectors from the backplane shrouds. Do not insert the extraction tool unless the cable connector is locked into the shroud. Do not force the extraction tool deeper than the detent on the cable connector.

Follow the procedure below to remove cable connectors from the backplane. Use extreme caution to avoid bending or breaking backplane pins. Do not insert the extraction tool unless the cable connector is locked into the securing clip; a gentle tug on the cable will allow you to determine whether or not the connector is secured. Do not force the extraction tool deeper than the tab on side of the cable connector hood.

- 1** Grasp the cable connector by the strain relief tab.
- 2** Center the long flat edge at the angled end of the tool between the cable connector hood and the securing clip.

Note: If the straight end of the tool is notched, use that end if the connector can be accessed straight-on. If you must approach the connector from any angle at all, use the angled end.

- 3 Gently insert the extraction tool and gradually apply pressure in the direction directly toward the backplane while gently pulling the cable away from the backplane. A gentle side-to-side rocking motion may be used on the cable if needed.

CAUTION

Do not pry the against the connector with the extraction tool. Simply inserting the tool between the connector and the securing clip is sufficient to unlock the connector. Prying may cause damage to the connector or the backplane pins.

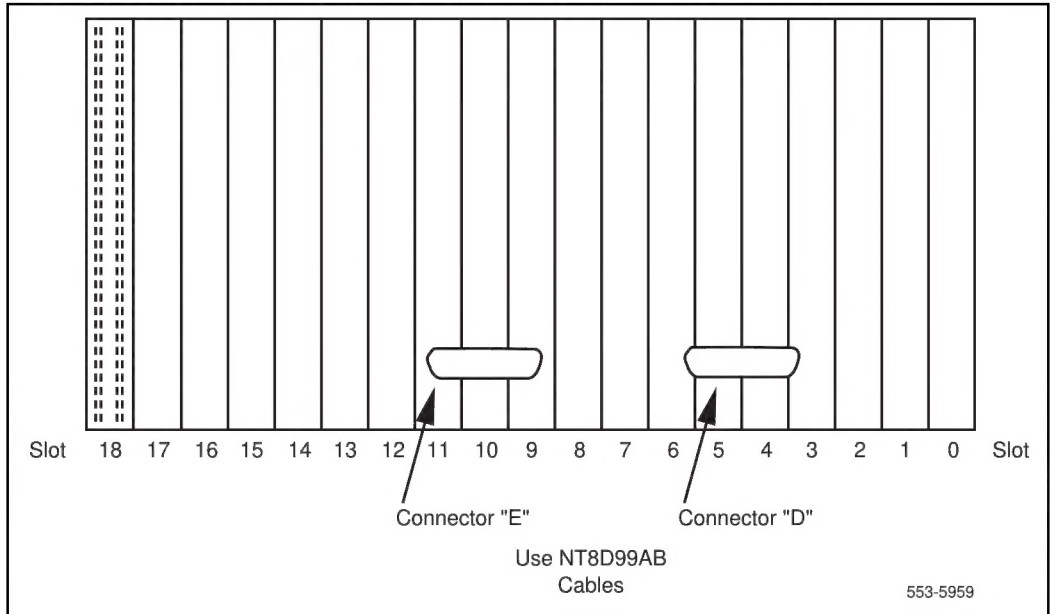
- 4 Stop applying pressure as soon as the cable connector comes loose from the backplane.
- 5 Slowly remove the extraction tool and the cable connector.

Cable installation procedures

A P0738866 label kit is included in all option 61C packages. The kit is included in all packages because the preprinted labels may be useful. Use of the labels is optional.

- 1 Connect network half-group 0 in Core/Net 0 to half-group 1 in Core/Net 1:
 - Cable the D connectors (on the rear of the backplane) together with an NT8D99AB cable.
 - Cable the E connectors (on the rear of the backplane) together with another NT8D99AB cable.
 - [Figure 69](#) shows the D and E connectors on the backplane of the NT5D21 Core/Net Module and the cables required.
- 2 At the rear of the module, remove the left I/O panels. Verify that the following cables are installed in both Core/Net Modules (see [Figure 70](#)):
 - An NT7D89 RS-232 cable (CP to I/O panel) should be connected to backplane connector position 15D and to ports J21 and J25 on the I/O panel. Check the labeling on the cables to identify the J21 and J25 connectors.
 - An NT7D90 Ethernet cable should be connected to backplane connector position 17F and to port J28 on the I/O panel.

Figure 69
NT5D21 Core/Net Module (rear view)—location of D and E connectors



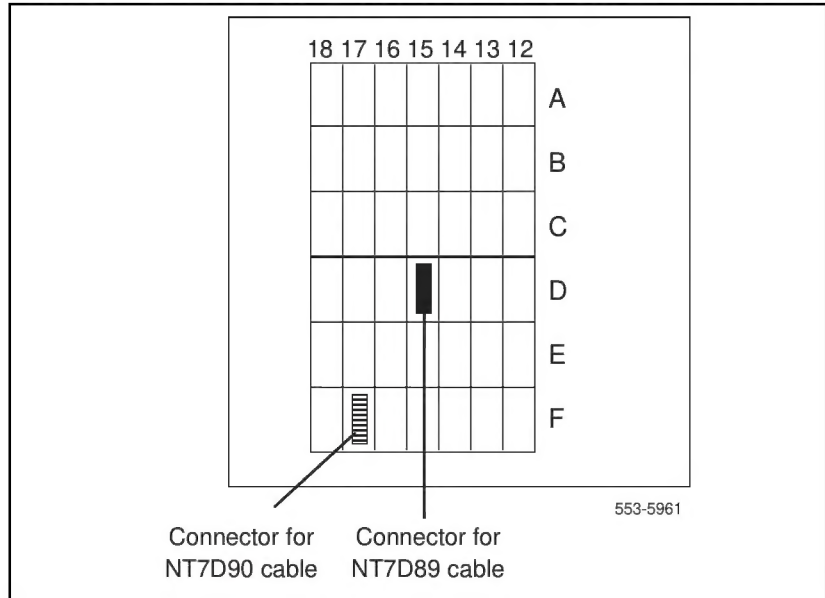
- 3** On the faceplates of the 3PE cards in the Core/Net Modules:
 - connect an NT8D80BZ cable from J4 in Core/Net 0 to J4 in Core/Net 1
 - connect another NT8D80BZ cable from J3 in Core/Net 0 to J3 in Core/Net 1.

- 4** In the rear of the Core/Net Modules, connect the cables between Core/Net 0 and Core/Net 1 (see [Figure 71](#) on [page 145](#)):

Note 1: The following cables may already be connected in one of the modules. If so, leave them connected and attach the loose end.

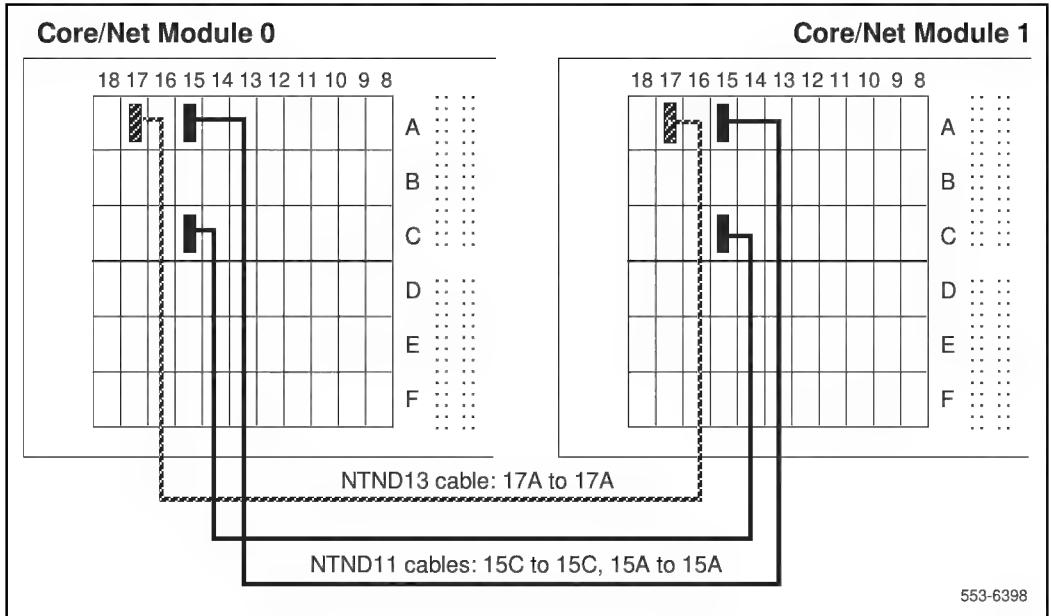
Note 2: The cables must be routed as perpendicular as possible to nearby power cables.

Figure 70
NT5D21 Core/Net Module (rear)—pre-installed backplane connections



- Connect the NTND13 IOP to IOP SCSI Cable from backplane connector position 17A in Core/Net 0 to backplane connector position 17A in Core/Net 1 (see [Figure 71](#)).
- Connect one NTND11 CP to CP Cable from backplane connector position 15C in Core/Net 0 to backplane connector position 15C in Core/Net 1 (see [Figure 71](#)).
- Connect another NTND11 cable from backplane connector position 15A in Core/Net 0 to backplane connector position 15A in Core/Net 1 (see [Figure 71](#)).
- Reinstall the left I/O panels in both Core/Net Modules. Use and tighten all eight screws.

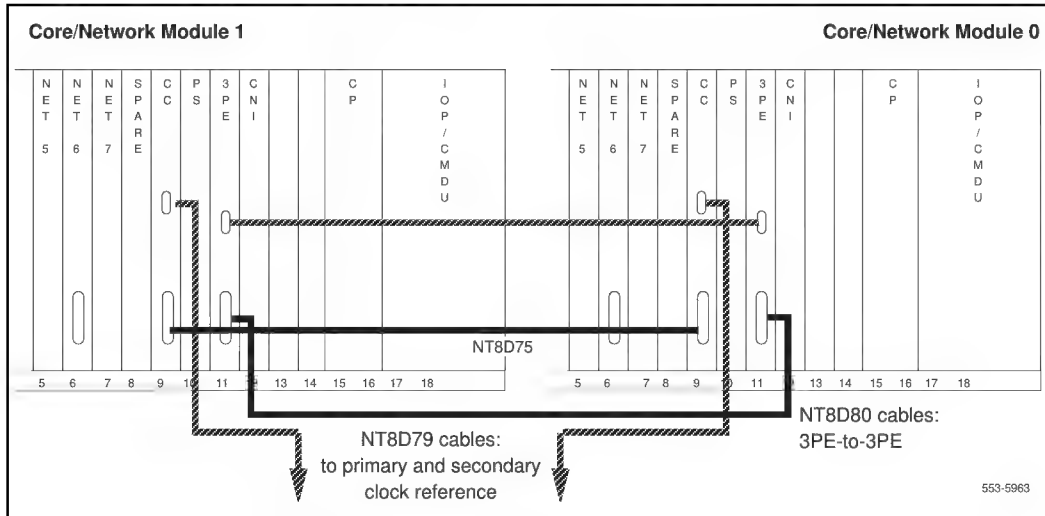
Figure 71
NT5D21 Core/Net Module (rear)—connections for IOP/CMDU to IOP/CMDU and CP to CP
cables



5 Interconnect the clock controller cards in both Core/Net Modules (see [Figure 72](#)).

- Connect an NT8D75 (BC or BD length as needed) from the faceplate connector on the clock controller card in Core/Net 0 to the faceplate connector on the clock controller card in Core/Net 1.

Figure 72
NT5D21 Core/Net Module (front)—clock controller card connections



6 If PRI/DTI cards are equipped in the Core/Net Modules, connect the faceplate cables.

Note: For detailed instructions on PRI/DTI connections, see *ISDN Primary Rate Interface installation* (553-2901-200).

- Connect a QCAD133 cable from connector J4 on the card to the I/O panel.
- Connect an NT8D85 cable from connector J3 on the card to the selected QPC414 Network Card.
- If needed, connect two NT8D79 cables from connectors J1 and J2 on the card to the respective clock controller cards in each Core/Net Module.

System option 71

Option 71 is a dual CPU system with standby processing capabilities, fully redundant memory, and up to five full network groups. The following modules are required:

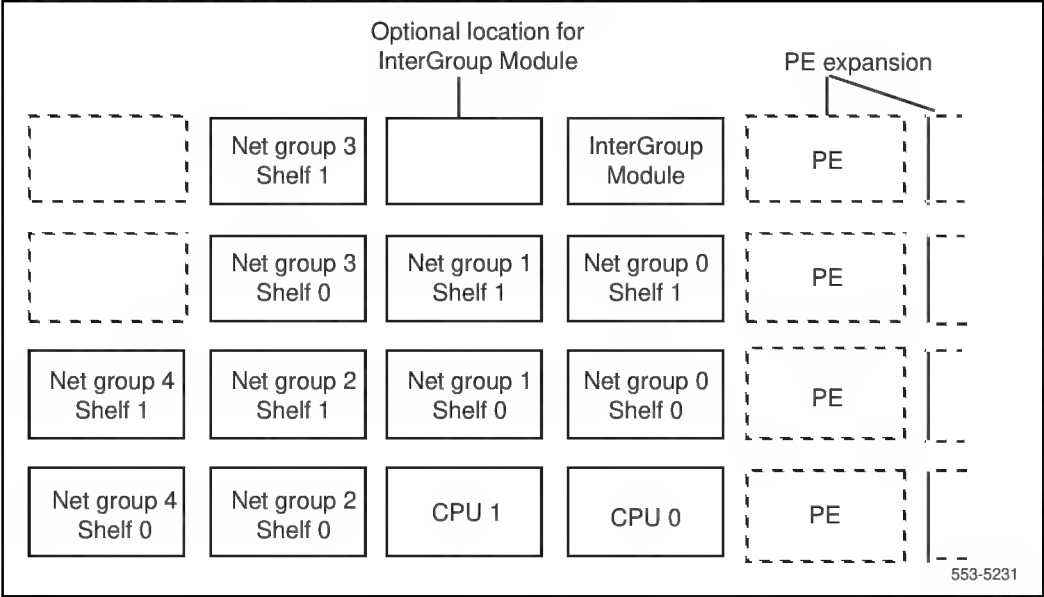
- two CPU Modules
- one InterGroup Module
- a minimum of two Network Modules (provides one network group)
- a minimum of one IPE Module

Additional Network and IPE Modules are required for additional network groups. PE Modules, RPE Modules, and application modules can also be used.

Note: The terminating plugs in the InterGroup Module for unused connectors are pre-installed in the factory. These should be removed only when additional groups are installed. Remove a plug just before the connector is installed for a new group and installed a plug immediately after a cable is disconnected when a group is removed.

[Figure 73](#) shows a typical configuration. Additional columns can be added, and there can be more than one row of columns.

Figure 73
Option 71 dual CPU, multiple network group configuration



Cable installation

- 1 Connect the NTND10 Changeover and Memory Arbitrator (CMA) Card (QPC581 before X11 release 18) in CPU/Network 0 to the CMA card in CPU/Network 1:
 - Connect J2 to J2 with an NT8D80BZ cable.
 - Connect J1 to J1 with an NT8D85BZ cable.
 - [Figure 74](#) shows the CMA card position in the NT8D34 CPU Module and the cables required.
- 2 Connect the QPC471 or QPC775 Clock Controller (CC) Cards in CPU Modules 0 and 1 to the InterGroup Module (IGM):
 - Connect the clock controller card in CPU Module 0 to connector SCG 0 in the InterGroup Module with an NT8D74 cable.
 - Connect the clock controller card in CPU Module 1 to connector SCG 1 in the InterGroup Module with an NT8D74 cable.
 - [Figure 74](#) shows the clock controller card position in the NT8D34 CPU Module and the cable required.
 - [Figure 75](#) shows the clock controller connection points in the NT8D36 InterGroup Module.
 - [Figure 77](#) shows the recommended cable routing.
- 3 Connect the QPC215 Segmented Bus Extender (SBE) Cards in CPU Modules 0 and 1 to the QPC441 3-Port Extender (3PE) Cards in network shelves 0 and 1 for every network group:
 - Connect SBE cards to 3PE cards with NT8D80 cables. [Table 14](#) lists the SBE to 3PE connections.
 - [Figure 74](#) shows the positions of the SBE cards in the NT8D34 CPU Module and the cable required.
 - [Figure 76](#) shows the 3PE card position in the NT8D35 Network Module.
 - [Figures 78](#) through [82](#) show the recommended cable routing.

Table 14
SBE to 3PE cable assignment—use NT8D80 cables

From			To		
CPU module	SBE card	SBE connector	Network group	Network shelf	3PE connector
0	0	J3	0	0	J3
0	0	J4	0	0	J4
0	1	J3	1	0	J3
0	1	J4	1	0	J4
0	2	J3	2	0	J3
0	2	J4	2	0	J4
0	3	J3	3	0	J3
0	3	J4	3	0	J4
0	4	J3	4	0	J3
0	4	J4	4	0	J4
1	0	J3	0	1	J3
1	0	J4	0	1	J4
1	1	J3	1	1	J3
1	1	J4	1	1	J4
1	2	J3	2	1	J3
1	2	J4	2	1	J4
1	3	J3	3	1	J3
1	3	J4	3	1	J4
1	4	J3	4	1	J3
1	4	J4	4	1	J4

- 4 Connect QPC412 InterGroup Switch (IGS) Cards 0 and 1 for each network group to the InterGroup Module:
 - Connect IGS cards to the InterGroup Module with NT8D76 cables. [Table 15](#) lists the IGS to InterGroup connections.
 - [Figure 76](#) shows the positions of the IGS cards in the NT8D35 Network Module and the cable required.
 - [Figure 75](#) shows the IGS connection points in the NT8D36 InterGroup Module.
 - [Figures 78](#) through [82](#) show recommended cable routing.
- 5 Seat and secure all connectors.

Table 15
IGS to InterGroup cable assignment—use NT8D76 cables

Network group	From		To
	Network shelf	IGS	InterGroup connector
0	0	0	J1
0	0	1	J6
0	1	1	J17
0	1	0	J22
1	0	0	J2
1	0	1	J7
1	1	1	J16
1	1	0	J21
2	0	0	J3
2	0	1	J8
2	1	1	J15
2	1	0	J20
3	0	0	J4
3	0	1	19
3	1	1	J14
3	1	0	J19
4	0	0	J5
4	0	1	J10
4	1	1	J13
4	1	0	J18

Figure 74
NT8D34 CPU Module (front view)—CMA, clock controller, and SBE cards

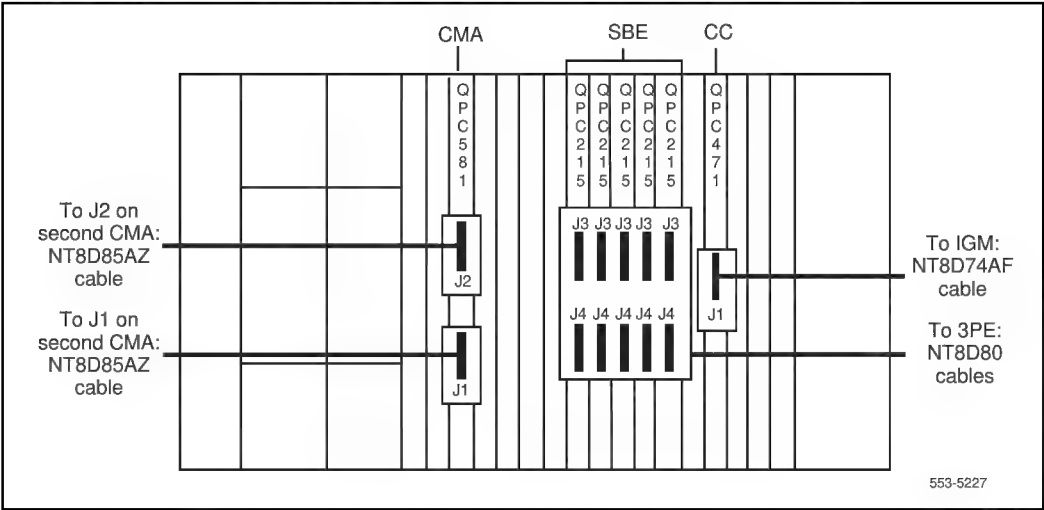


Figure 75
NT8D36 InterGroup Module connectors

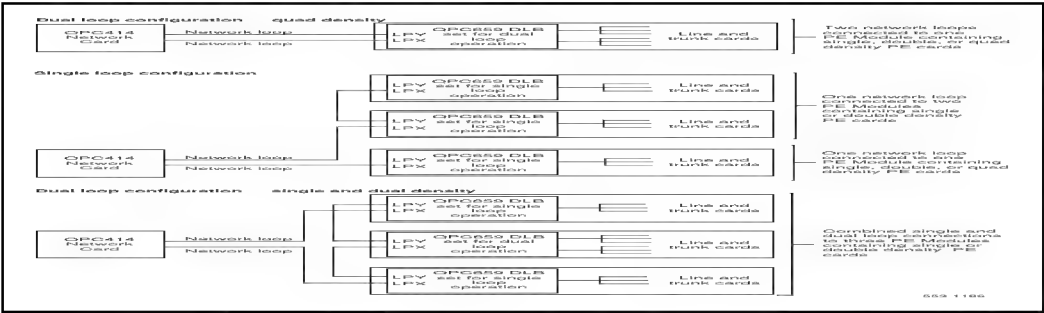


Figure 76
NT8D35 Network Module (front view)—3PE and IGS cables

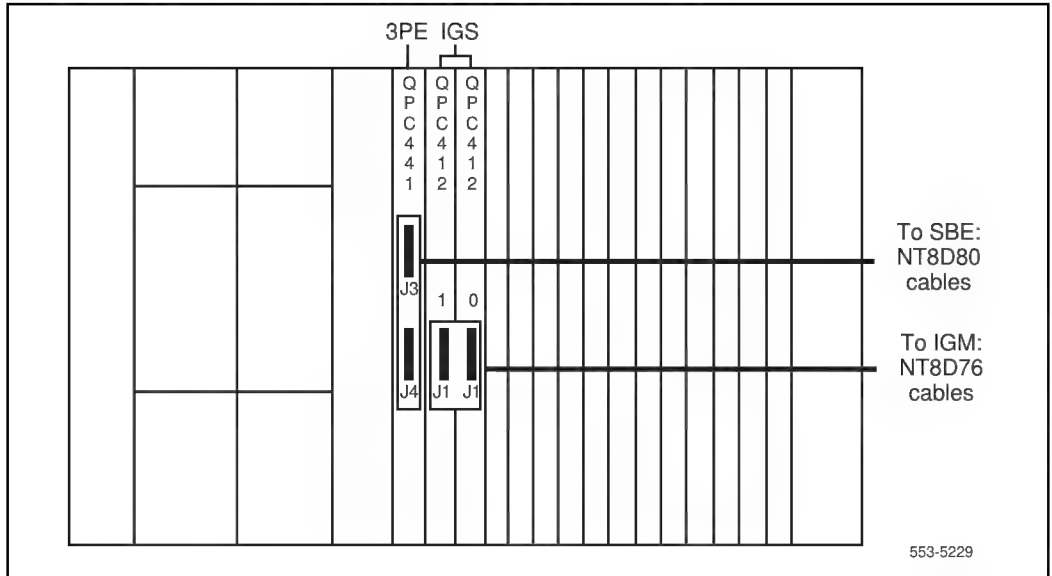


Figure 77
Cable routing from clock controller cards to InterGroup Module

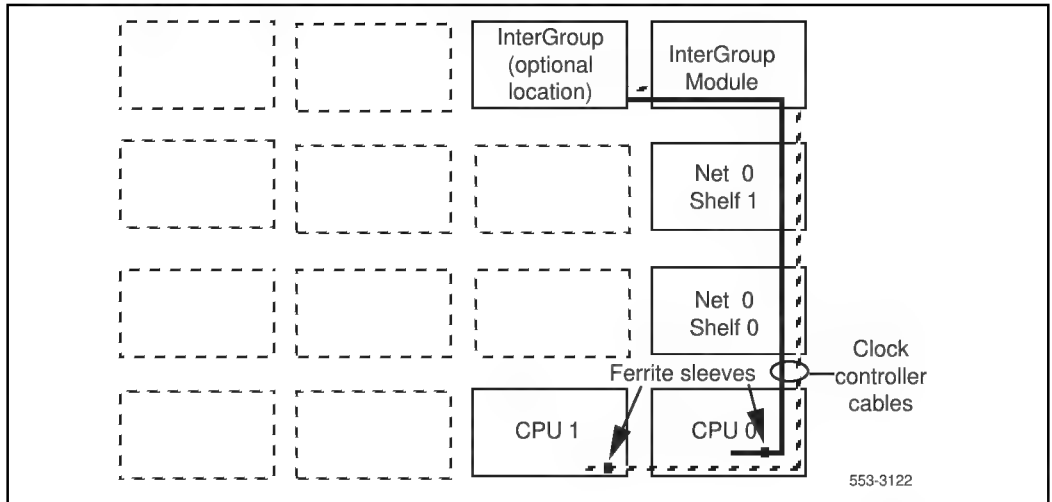


Figure 78
Network Group 0—cable routing to CPU and InterGroup Modules

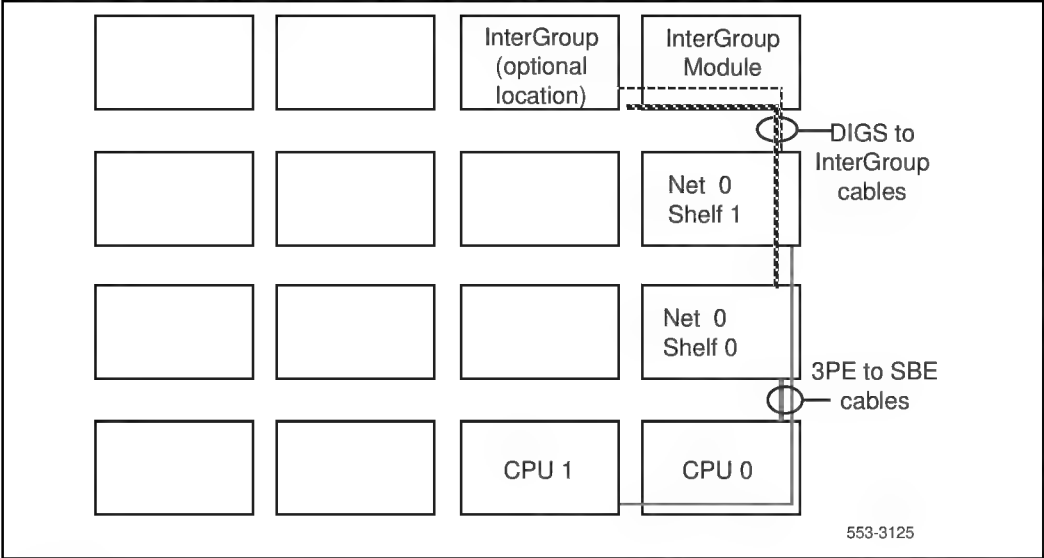


Figure 79
Network Group 1—cable routing to CPU and InterGroup Modules

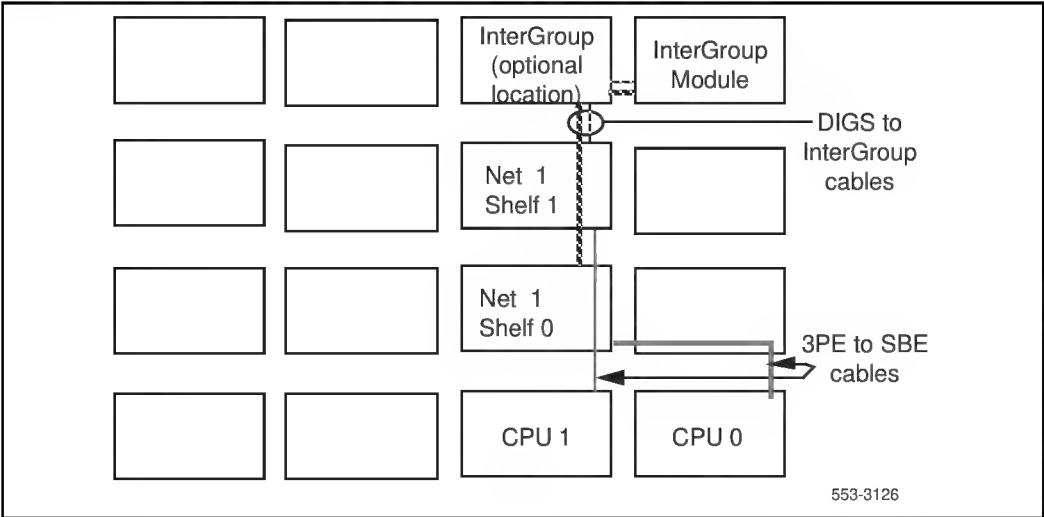


Figure 80
Network Group 2—cable routing to CPU and InterGroup Modules

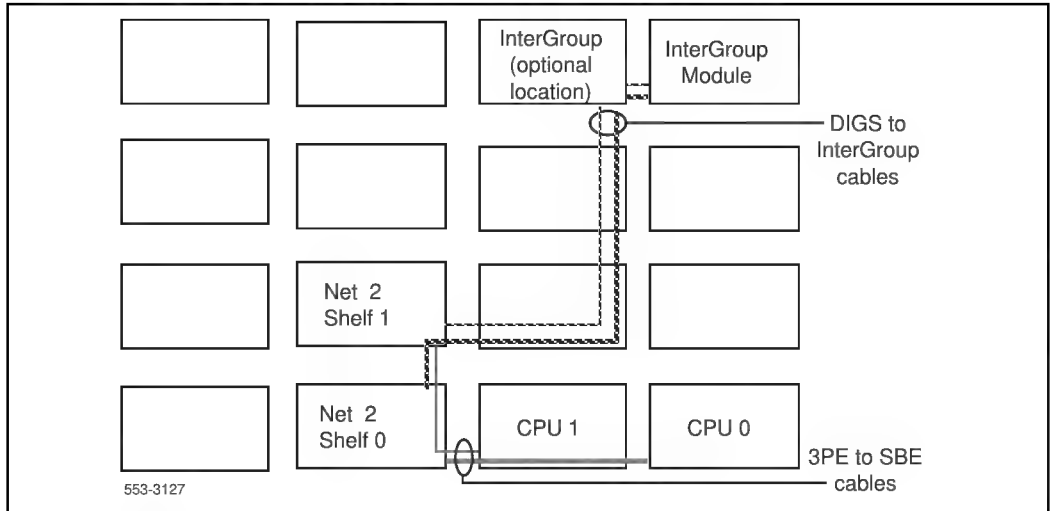


Figure 81
Network Group 3—cable routing to CPU and InterGroup Modules

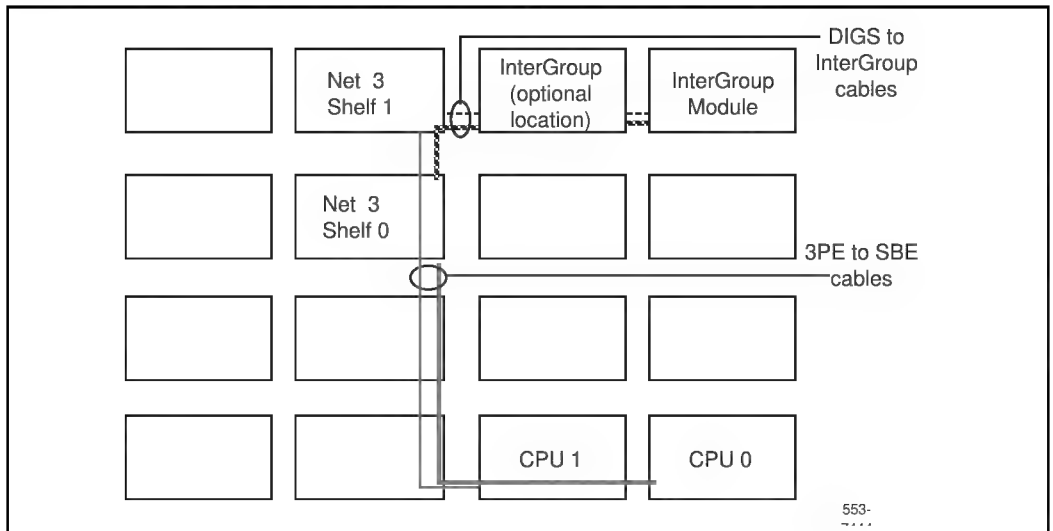
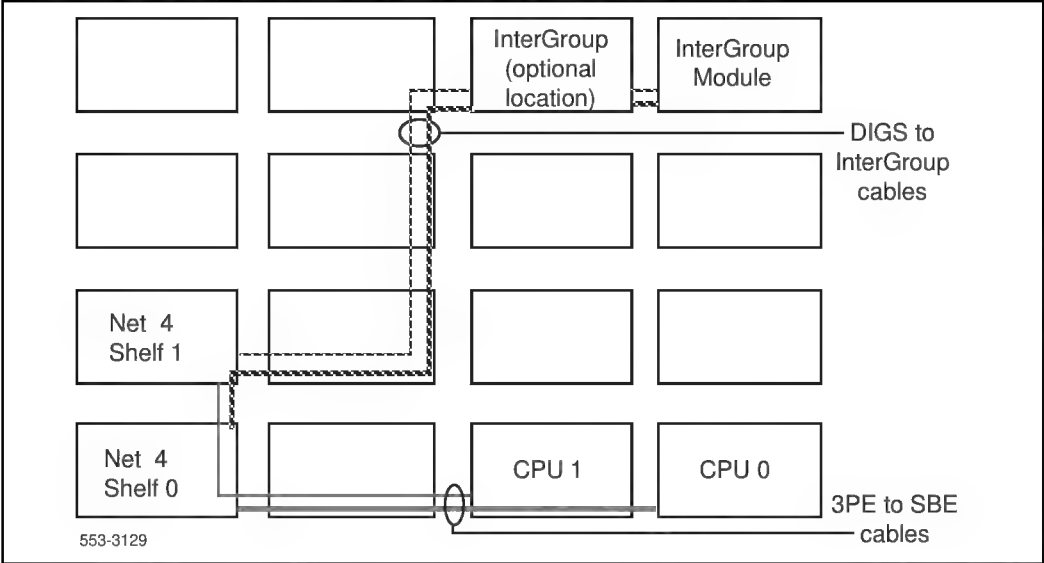


Figure 82
Network Group 4—cable routing to CPU and InterGroup Modules



System option 81

Option 81 is a dual CPU system with standby processing capabilities, fully redundant memory, and up to five full network groups. Option 81 is equipped with two redundant disk drive units.

The following modules are required:

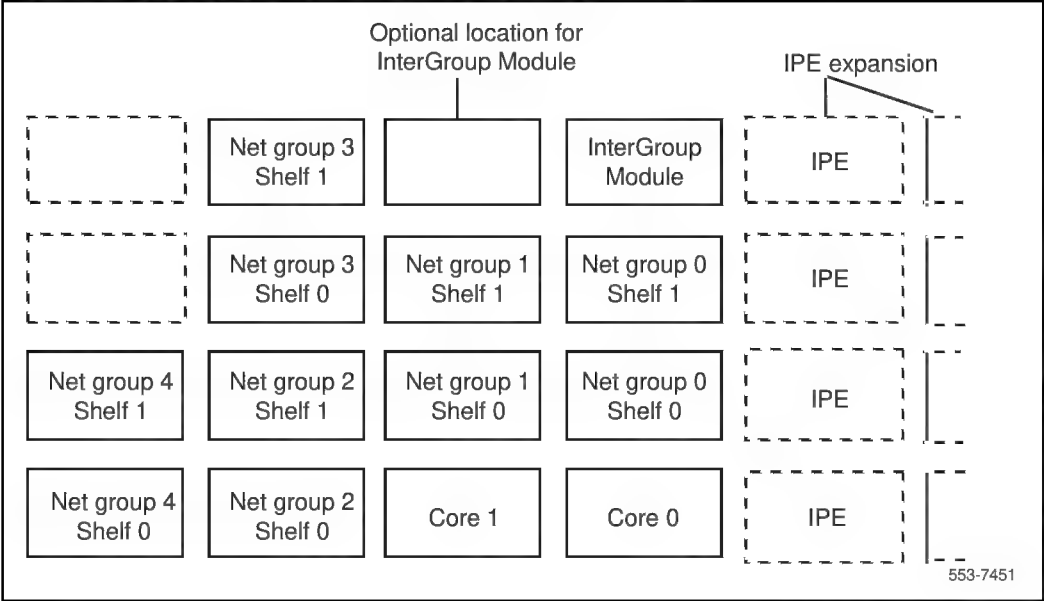
- two Core Modules
- one InterGroup Module
- a minimum of two Network Modules (provides one network group)
- a minimum of one IPE Module

Additional Network and IPE Modules are required for additional network groups. PE Modules, RPE Modules, and application modules can also be used.

Note: The terminating plugs in the InterGroup Module for unused connectors are pre-installed in the factory. These should be removed only when additional groups are installed. Remove a plug just before the connector is installed for a new group and installed a plug immediately after a cable is disconnected when a group is removed.

[Figure 83](#) shows a typical configuration for five full network groups. Additional columns can be added, and there can be more than one row of columns.

Figure 83
Option 81 dual CPU, multiple network group configuration



CNI configuration

In the NT6D60 Core Module, port 0 on the NT6D65 Core to Network Interface (CNI) Card in slot 8 must be configured as “group 5.” This is not equivalent to a network switching group (groups 0–4). “Group 5” extends the CE bus to the interface section in the Core Module. This extension is through the CNI card in slot 8, backplane bussing, and a QPC441 3-Port Extender (3PE) Card in slot 7. No cable is used.

There are two ports on each CNI card. However, if only one CNI card is equipped, only one network group is supported. This is because the CNI card must be installed in slot 8 in the Core Module, and Port 0 is dedicated to “group 5.” Only Port 1 is available to support a network switching group. Therefore, to support two network groups, two CNI cards are required. To support three network groups, still only two CNI cards are required, because one port is available in slot 8 and two ports are available on the second CNI card.

In a typical configuration, there are three CNI cards for five network groups (see [Table 20](#)) in each Core Module.

Table 16
Typical CNI configuration (option 81)

CNI card slot / port	Network group supported
CNI 8 / Port 0	Core bus extender (preconfigured as “group 5”)
CNI 8 / Port 1	Group 0
CNI 9 / Port 0	Group 1
CNI 9 / Port 1	Group 2
CNI 10 / Port 0	Group 3
CNI 10 / Port 1	Group 4
Note: Each port on the CNI card provides functions similar to one QPC215 SBE Card in option 71. You do not have to configure both ports on the CNI card.	

Cable installation guidelines

Core Module backplanes, like all circuit boards, have a primary side and a secondary side. The primary side, which faces the front of the module, contains the primary shrouds, which provide mechanical guidance for the pins of the card edge connectors. The secondary side of the backplane, which faces the rear of the module, contains the secondary shrouds, which provide mechanical guidance for cable connectors.

The columns of secondary backplane shrouds are designated 18 through 8 from left to right (facing the rear of the backplane). This numbering matches the card slots in the front of the module. The connector rows of secondary backplane shrouds are designated A through F from top to bottom.

Before you connect cables to the backplane, visually inspect the backplane shroud connectors to make sure there are no bent pins. To connect cables:

- 1** Orient the cable connector so that the cable runs downwards.
- 2** Partially insert the cable connector so its guides mate to the corresponding backplane connector.
- 3** Apply a small amount of pressure to push the cable connector straight into the backplane connector. You will feel a detent click when the connector seats.

CAUTION

Pins may be bent or broken if you try to insert the cable connector at an angle. Do not push the connector in any further after you hear the detent click.

Using the extraction tool

To disconnect a cable from the Core Module backplane, use the P0741489 Extraction Tool provided in the rear of the module (behind the I/O safety panel).

CAUTION

You must use the P0741489 Extraction Tool to disconnect cables from the backplane shrouds in NT6D60 Core Modules.

Follow the procedure below to avoid bending or breaking pins when removing cable connectors from the backplane shrouds. Do not insert the extraction tool unless the cable connector is locked into the shroud. Do not force the extraction tool deeper than the detent on the cable connector.

- 1** Grasp the cable connector by the strain relief tab.
- 2** Center the longer flat edge on the angled end of the tool between the cable connector and the wall of the shroud on the right side of the cable connector.

Note: If the straight end of the tool is notched, use that end if the connector can be accessed straight-on. If you must angle the tool at all, use the angled end.
- 3** *Gently* insert the extraction tool and gradually apply pressure while gently rocking the cable connector up and down.
- 4** Stop applying pressure as soon as the detent of the cable connector comes loose from the shroud.
- 5** Slowly remove the extraction tool and the cable connector.

Cable installation procedures

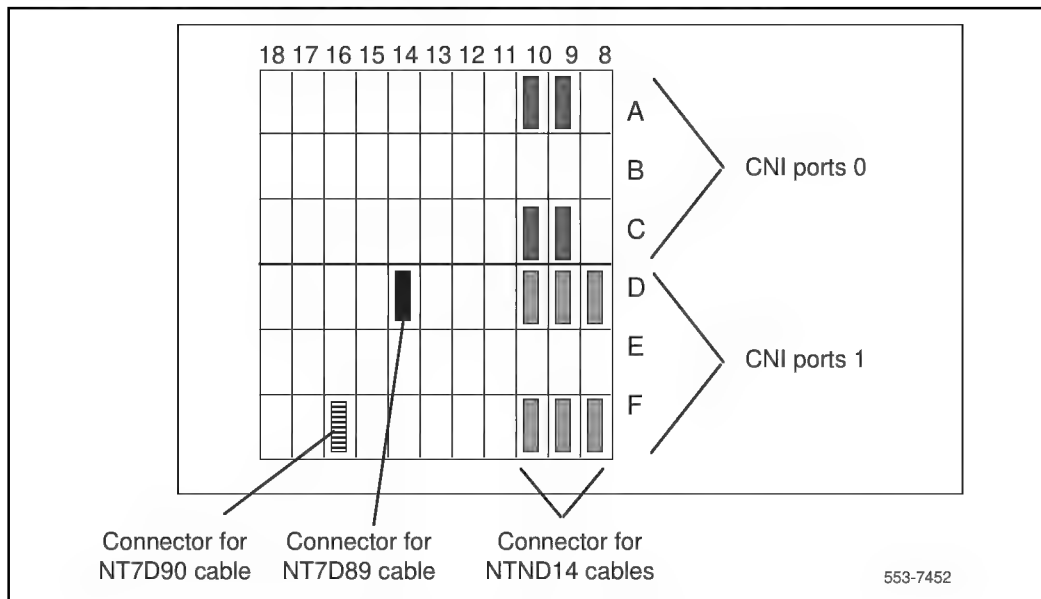
A P0738866 Label Kit is included in all option 81 packages. The kit is included in all packages because the preprinted labels may be useful (such as for labeling CNI to 3PE cables). Use of the labels is optional.

- 1
- At the rear of the module, remove the left I/O panels. Verify that the following cables are installed in both Core Modules (see [Figure 84](#)):
- An NT7D89 RS-232 cable (CP to I/O panel) should be connected to backplane connector position 14D and to ports J21 and J25 on the I/O panel. Check the labeling on the cables to identify the J21 and J25 connectors.
 - An NT7D90 Ethernet cable should be connected to backplane connector position 16F and to port J28 on the I/O panel.
 - NTND14 CNI to 3PE Cables should be connected to the appropriate backplane connector positions for all network groups ([Table 17](#)). The cables should be secured to the cable restraint bracket behind the right (facing the rear) I/O panel.

Table 17
CNI backplane connector positions—NTND14 cables

Backplane connection	Group
8D	0
8F	0
9A	1
9C	1
9D	2
9F	2
10A	3
10C	3
10D	4
10F	4
Note: Backplane shroud designations are 18 through 8 from left to right and A through F from top to bottom.	

Figure 84
NT6D60 Core Module (rear)—preinstalled backplane connections



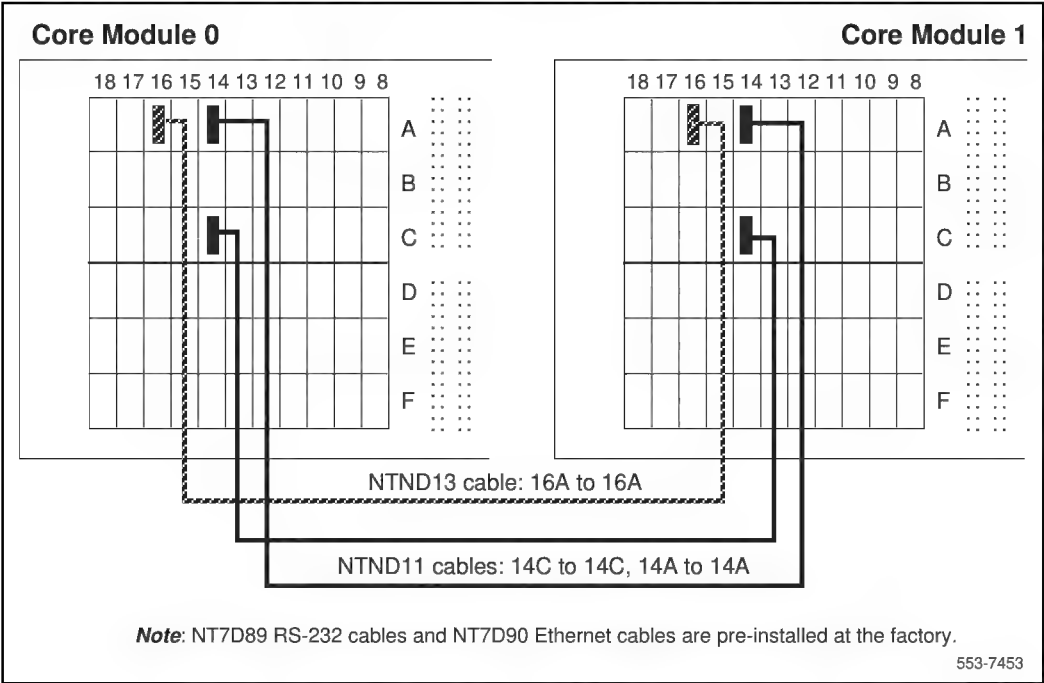
- 2 On the faceplates of the 3PE cards in the Core Modules
 - connect an NT8D80BZ cable from J4 in Core 0 to J4 in Core 1
 - connect another NT8D80BZ cable from J3 in Core 0 to J3 in Core.
- 3 In the rear of the Core Modules, connect the cables between Core 0 and Core 1 (see [Figure 85](#)):

Note 1: The following cables may already be connected in one of the modules. If so, leave them connected and attach the loose end.

Note 2: The cables must be routed as perpendicular as possible to nearby power cables.

- Connect the NTND13 IOP to IOP SCSI Cable from backplane connector position 16A in Core 0 to backplane connector position 16A in Core 1 (see [Figure 85](#)).
- Connect one NTND11 CP to CP Cable from backplane connector position 14C in Core 0 to backplane connector position 14C in Core 1 (see [Figure 85](#)).
- Connect another NTND11 cable from backplane connector position 14A in Core 0 to backplane connector position 14A in Core 1.
- Reinstall the left I/O panels in both Core Modules. Use and tighten all eight screws.

Figure 85
NT6D60 Core Module (rear)—connections for IOP to IOP and CP to CP cables



- 4 Connect the clock controller cards in both Core Modules to the junctor board in the InterGroup Module (see [Figure 86](#)). Route the cables as shown in [Figure 87](#).
 - Connect an NT8D74 (AE or AF length as needed) from the faceplate connector on the clock controller card in Core 0 to connector SCG 0 (J11) in the InterGroup Module.
 - Connect an NT8D74 (AE or AF length as needed) from the faceplate connector on the clock controller card in Core 1 to connector SCG 1 (J12) in the InterGroup Module.
- 5 If PRI/DTI cards are equipped in the Core Modules, connect the faceplate cables.

Note: For detailed instructions on PRI/DTI connections, see *ISDN Primary Rate Interface installation* (553-2901-200).

- Connect a QCAD133 cable from connector J4 on the card to the I/O panel.
- Connect an NT8D85 cable from connector J3 on the card to the selected QPC414 Network Card.
- If needed, connect two NT8D79 cables from connectors J1 and J2 on the card to the respective clock controller cards in each Core Module.

Figure 86
NT6D60 Core Module (front)—clock controller card connections

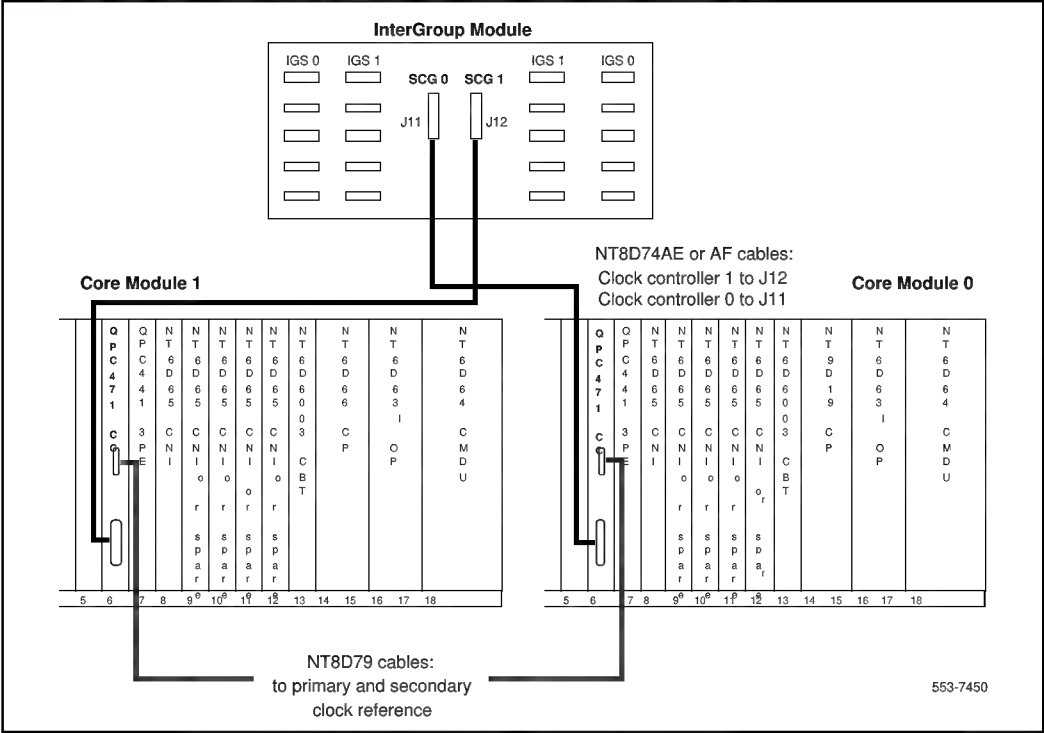
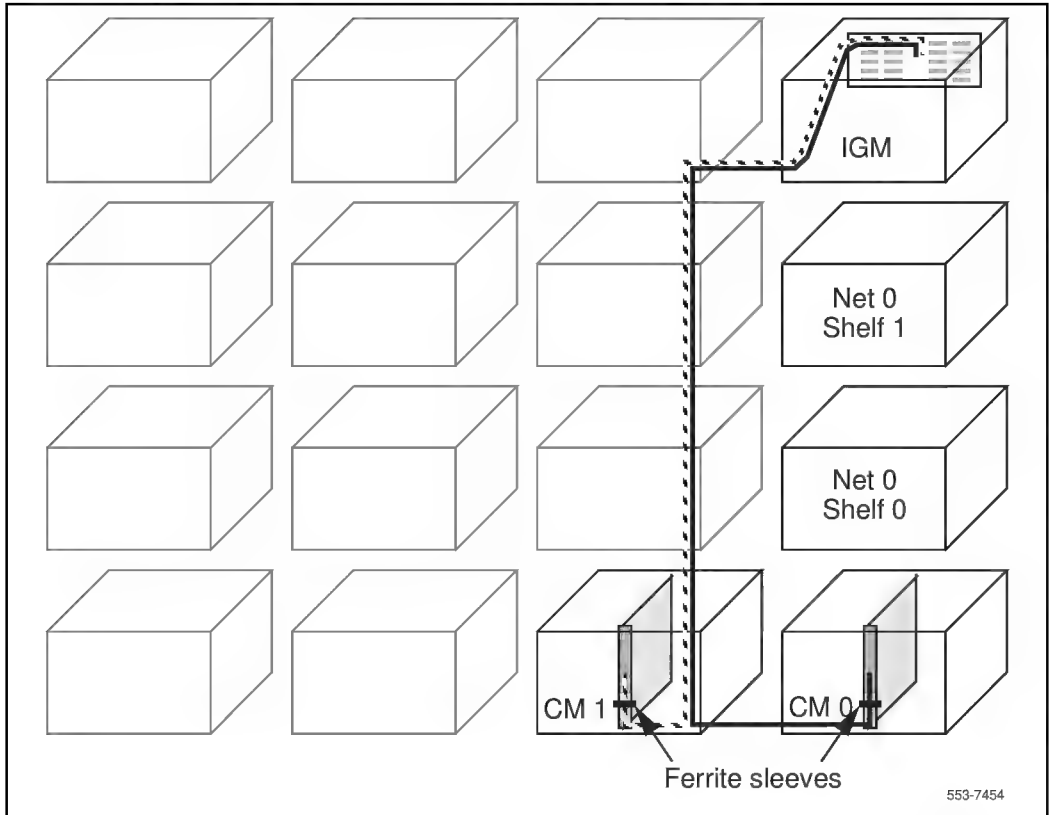


Figure 87
Cable routing from clock controller cards to InterGroup Module



- 6 Connect the NTND14 cable pairs to the QPC441 3PE Cards in the Network Modules. [Table 18](#) lists the CNI to 3PE connections. [Figures 89](#) through [93](#) show the recommended cable routing.

Note: This step does not apply to the QPC441 3PE card in the Core Module.

Table 18
CNI to 3PE connections—NTND14 cables

Core	Backplane Connector	Group	Shelf	3PE connection
0	8D	0	0	J3
0	8F	0	0	J4
0	9A	1	0	J3
0	9C	1	0	J4
0	9D	2	0	J3
0	9F	2	0	J4
0	10A	3	0	J3
0	10C	3	0	J4
0	10D	4	0	J3
0	10F	4	0	J4
1	8D	0	1	J3
1	8F	0	1	J4
1	9A	1	1	J3
1	9C	1	1	J4
1	9D	2	1	J3
1	9F	2	1	J4
1	10A	3	1	J3
1	10C	3	1	J4
1	10D	4	1	J3
1	10F	4	1	J4
Note: Backplane shroud designations are 18 through 8 from left to right and A through F from top to bottom.				

- 7 Connect QPC412 InterGroup Switch (IGS) Cards 0 and 1 for each network group to the junctor board in the InterGroup Module.
- With NT8D76 cables, connect the faceplate connectors on the IGS cards to the InterGroup Module. [Table 24](#) lists the IGS to InterGroup connections.
 - [Figure 88](#) shows the IGS connection points in the NT8D36 InterGroup Module.
 - [Figures 88](#) through [93](#) show the recommended cable routing.

Table 19
IGS to InterGroup cable assignment—use NT8D76 cables

Network group	From		To
	Network shelf	IGS connector J1	InterGroup connector
0	0	0	J1
0	0	1	J6
0	1	1	J17
0	1	0	J22
1	0	0	J2
1	0	1	J7
1	1	1	J16
1	1	0	J21
2	0	0	J3
2	0	1	J8
2	1	1	J15
2	1	0	J20
3	0	0	J4
3	0	1	J9
3	1	1	J14
3	1	0	J19
4	0	0	J5
4	0	1	J10
4	1	1	J13
4	1	0	J18

Figure 88
NT8D36 InterGroup Module—connectors for IGS cards

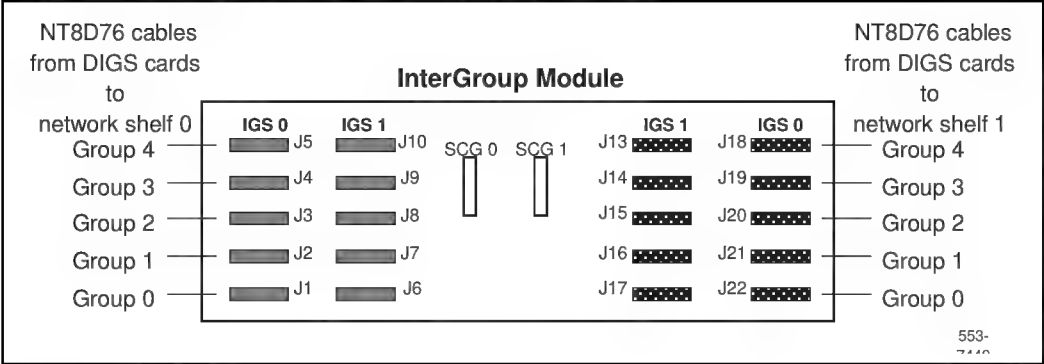


Figure 89
Network Group 0—cable routing to Core and InterGroup Modules

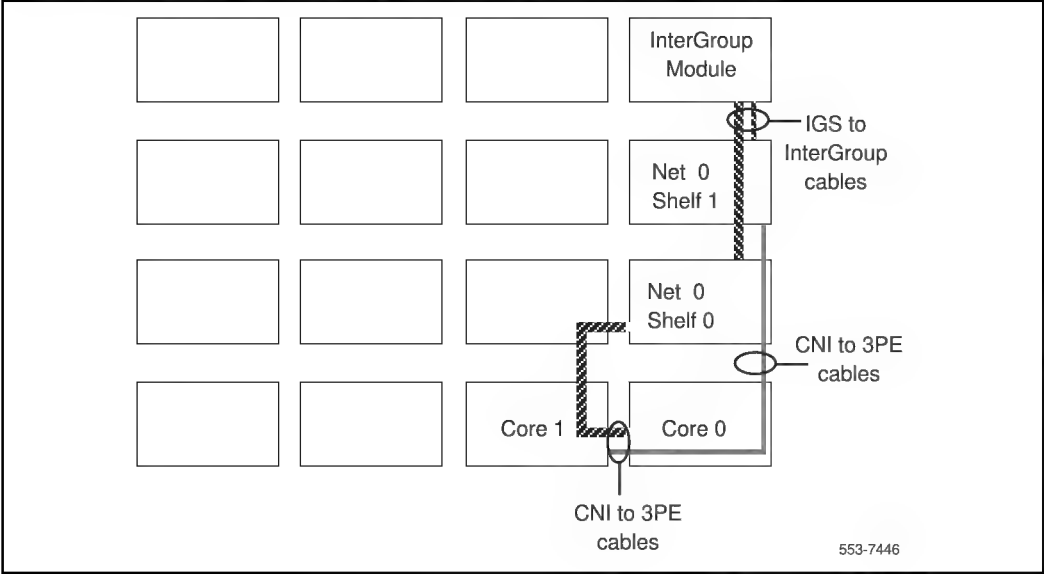


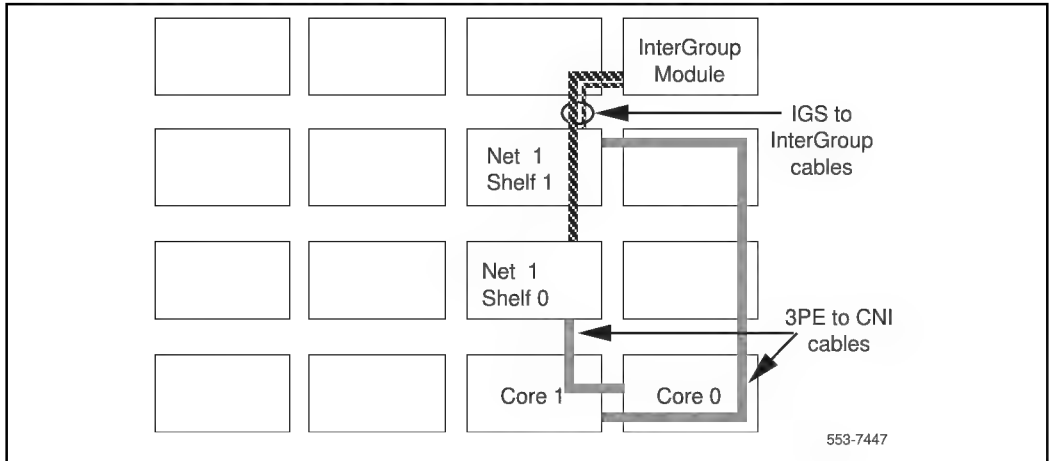
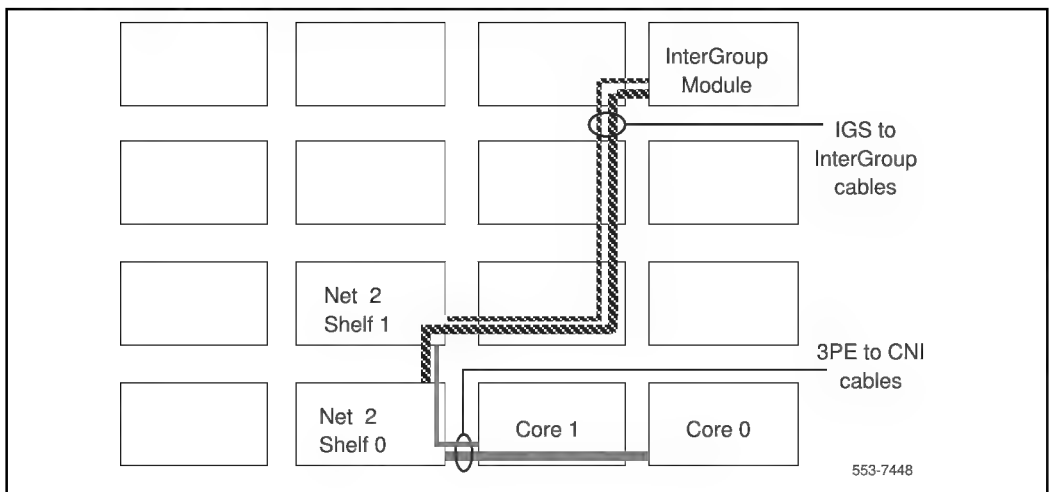
Figure 90**Network Group 1—cable routing to Core and InterGroup Modules****Figure 91****Network Group 2—cable routing to Core and InterGroup Modules**

Figure 92
Network Group 3—cable routing to Core and InterGroup Modules

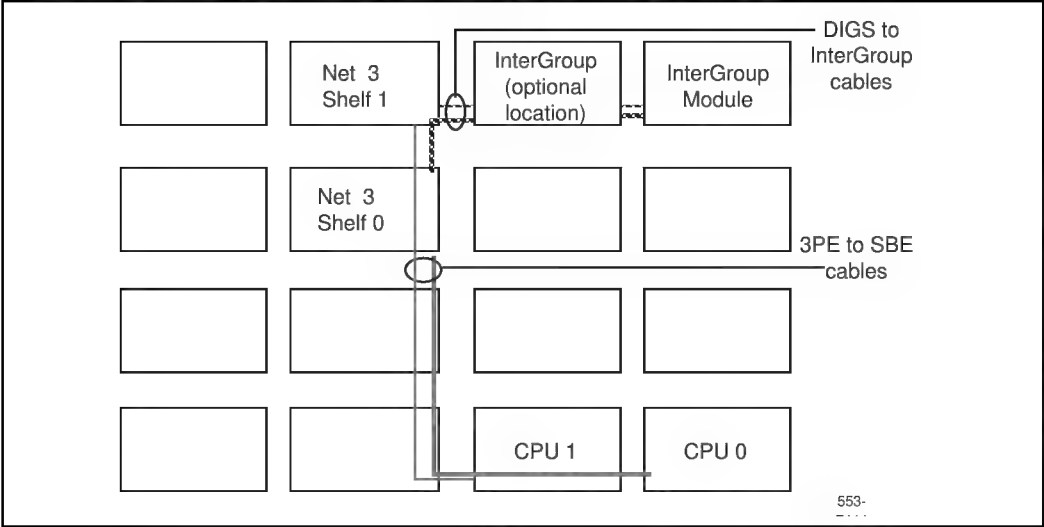
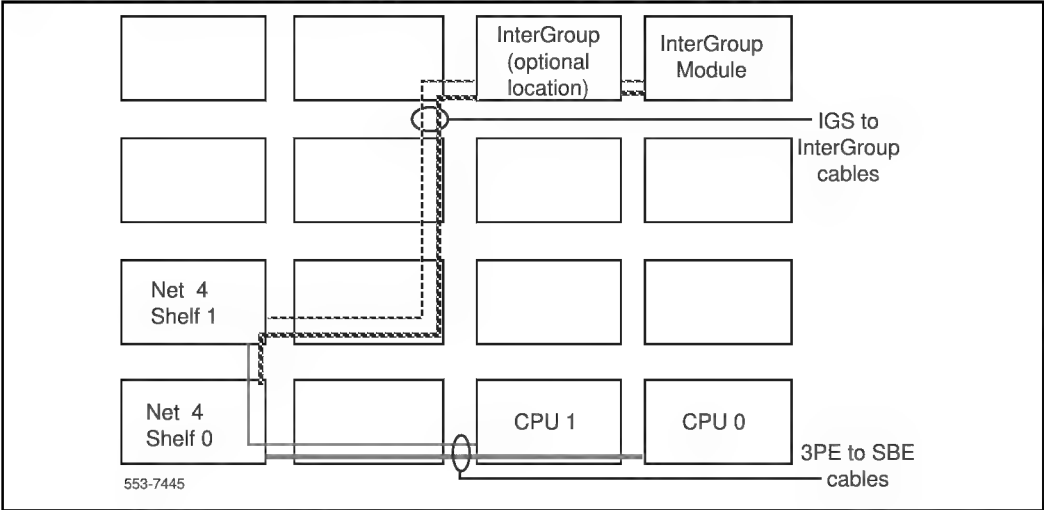


Figure 93
Network Group 4—cable routing to Core and InterGroup Modules



To secure network group cables with tie-wraps, follow these instructions:

- 1** Tie-wrap to the Core 0 strain relief bracket, all Core 0 CNI to 3PE cables and Core 1 CNI to 3PE cables for groups 0 and 1. The strain relief bracket is located at the bottom of the right-hand-side I/O panel of the Core 0 Module, as viewed from the rear of the module.
- 2** Tie-wrap to the Core 1 strain relief bracket, Core 1 CNI to 3PE cables for network groups 2, 3, and 4. The strain relief bracket is located at the bottom of the right-hand-side I/O panel of the Core 1 Module, as viewed from the rear of the module.

System option 81C

Option 81C is a dual CPU system with standby processing capabilities, fully redundant memory, and up to five full network groups. Option 81C is equipped with two redundant disk drive units.

The following modules are required:

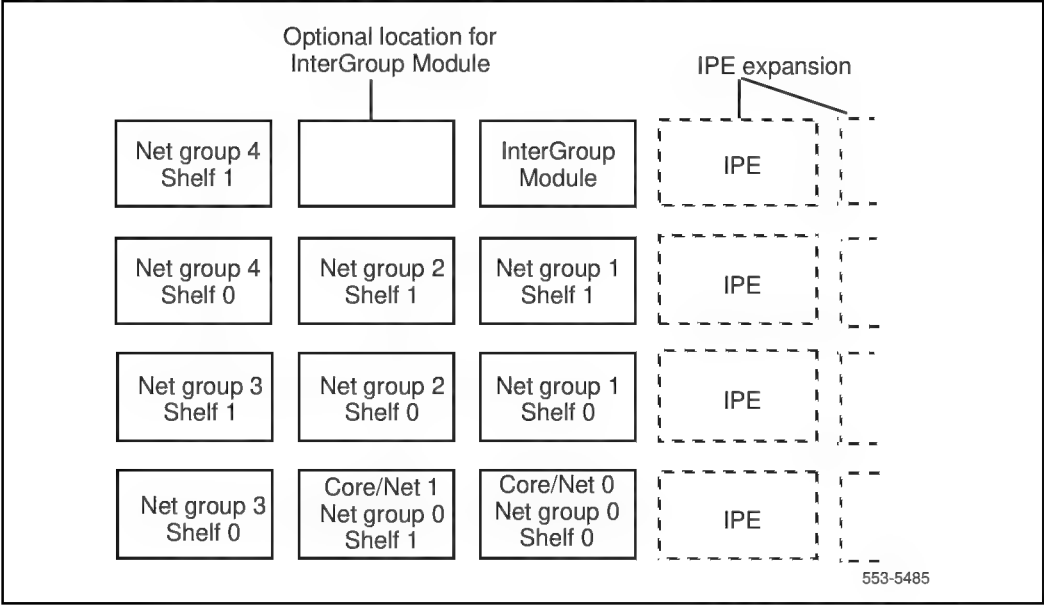
- two Core/Net Modules (houses CPU and one network group)
- one InterGroup Module
- a minimum of two Network Modules (provides one additional network group)
- a minimum of one IPE Module

Additional Network and IPE Modules are required for additional network groups. PE Modules, RPE Modules, and application modules can also be used.

Note: The terminating plugs in the InterGroup Module for unused connectors are pre-installed in the factory. These should be removed only when additional groups are installed. Remove a plug just before the connector is installed for a new group and install a plug immediately after a cable is disconnected when a group is removed.

Figure 94 shows a typical configuration for five full network groups. Additional columns can be added, and there can be more than one row of columns.

Figure 94
Option 81C dual CPU, multiple network group configuration



CNI configuration

In the NT5D21 Core/Net Module, port 0 on the NT6D65 Core to Network Interface (CNI) Card in slot 12 supports a half-group, which does not have to be group 0, however, in new system it is normally configured as group 0. Communication between the CNI and 3PE cards for group 0 is accomplished through the backplane; no cable is required.

There are two ports on each CNI card. For every additional two network groups, you must add an additional CNI card.

In a typical configuration, there are three CNI cards for five network groups (see [Table 20](#)) in each Core/Net Module.

Table 20
Typical CNI configuration (option 81C)

CNI card slot / port	Network group supported
CNI 12/ Port 0	Group 0
CNI 12/ Port 1	Group 1
CNI 13/ Port 0	Group 2
CNI 13/ Port 1	Group 3
CNI 14/ Port 0	Group 4

Note: Network groups configuration is flexible. Any CNI port may support any given network group, however, for ease of maintenance, associate network groups and CNI ports in a logical sequence. Refer to [Table 20](#) for a typical CNI port assignment and the associated network group in option 81C. Port 0 of the CNI in slot 12 and the 3PE card are hard-wired at the module's backplane.

Cable installation guidelines

Core/Net Module backplanes, like all circuit boards, have a primary side and a secondary side. The primary side, which faces the front of the module, contains the primary shrouds, which provide mechanical guidance for the pins of the card edge connectors. The secondary side of the backplane, which faces the rear of the module, contains the secondary shrouds, which provide mechanical guidance for cable connectors.

The columns of secondary backplane shrouds are designated 18 through 12 from left to right (facing the rear of the backplane). This numbering matches the card slots in the front of the module. The connector rows of secondary backplane shrouds are designated A through F from top to bottom.

Before you connect cables to the backplane, visually inspect the backplane shroud connectors to make sure there are no bent pins. To connect cables:

- 1** Orient the cable connector so that the cable runs downwards.
- 2** Partially insert the cable connector so its guides mate to the corresponding backplane connector.
- 3** Apply a small amount of pressure to push the cable connector straight into the backplane connector. You will feel a detent click when the connector seats.

CAUTION

Pins may be bent or broken if you try to insert the cable connector at an angle. Do not push the connector in any further after you hear the detent click.

Using the extraction tool

To disconnect a cable from the Core/Net Module backplane, use the P0741489 Extraction Tool provided in the rear of the module (behind the I/O safety panel).

CAUTION

You must use the P0741489 Extraction Tool to disconnect cables from the backplane shrouds in NT5D21 Core/Net Modules.

Follow the procedure below to avoid bending or breaking pins when removing cable connectors from the backplane shrouds. Do not insert the extraction tool unless the cable connector is locked into the shroud. Do not force the extraction tool deeper than the detent on the cable connector.

- 1** Grasp the cable connector by the strain relief tab.
- 2** Center the longer flat edge on the angled end of the tool between the cable connector and the wall of the shroud on the right side of the cable connector.

Note: If the straight end of the tool is notched, use that end if the connector can be accessed straight-on. If you must angle the tool at all, use the angled end.
- 3** *Gently* insert the extraction tool and gradually apply pressure while gently rocking the cable connector up and down.
- 4** Stop applying pressure as soon as the detent of the cable connector comes loose from the shroud.
- 5** Slowly remove the extraction tool and the cable connector.

Cable installation procedures

A label kit is included in all option 81C packages. The kit is included in all packages because the preprinted labels may be useful (such as for labeling CNI to 3PE cables). Use of the labels is optional.

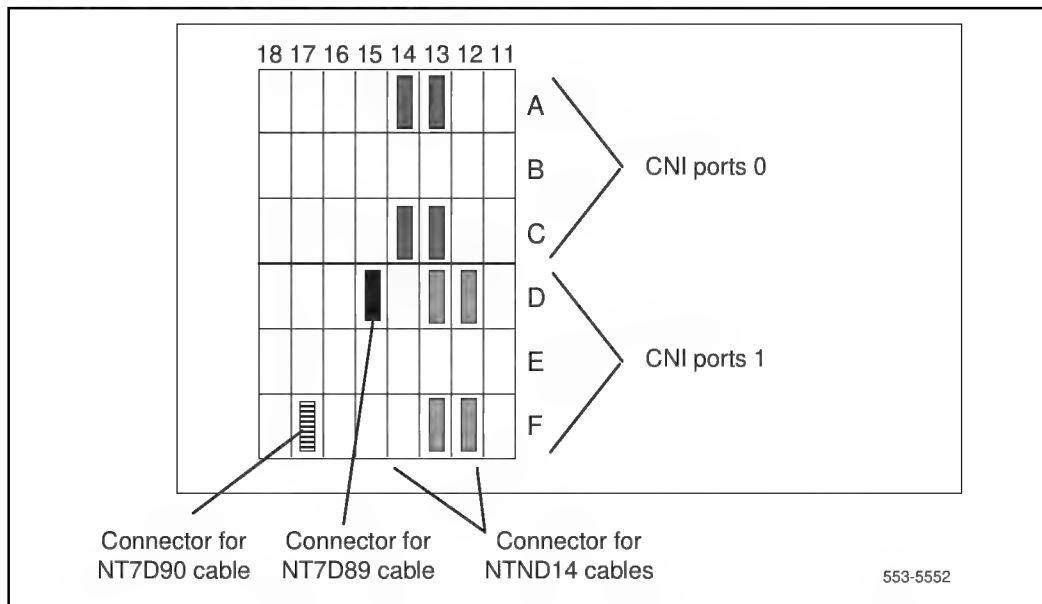
- 1 At the rear of the module, remove the left I/O panels. Verify that the following cables are installed in both Core/Net Modules (see [Figure 95](#)):
 - An NT7D89 RS-232 cable (CP to I/O panel) should be connected to backplane connector position 15D and to ports J21 and J25 on the I/O panel. Check the labeling on the cables to identify the J21 and J25 connectors.
 - An NT7D90 Ethernet cable should be connected to backplane connector position 17F and to port J28 on the I/O panel.
 - NTND14 CNI to 3PE Cables should be connected to the appropriate backplane connector positions for all network groups ([Table 21](#)). The cables should be secured to the cable restraint bracket behind the right (facing the rear) I/O panel.

Table 21
CNI backplane connector positions—NTND14 cables

Backplane connection	Group
12D	1
12F	1
13A	2
13C	2
13D	3
13F	3
14A	4
14C	4
Note: Backplane shroud designations are 18 through 12 from left to right and A through F from top to bottom.	

- 2 On the faceplates of the 3PE cards in the Core/Net Modules
 - connect an NT8D80BZ cable from J4 in Core/Net 0 to J4 in Core/Net 1
 - connect another NT8D80BZ cable from J3 in Core/Net 0 to J3 in Core/Net 1.

Figure 95
NT5D21 Core/Net Module (rear)—preinstalled backplane connections



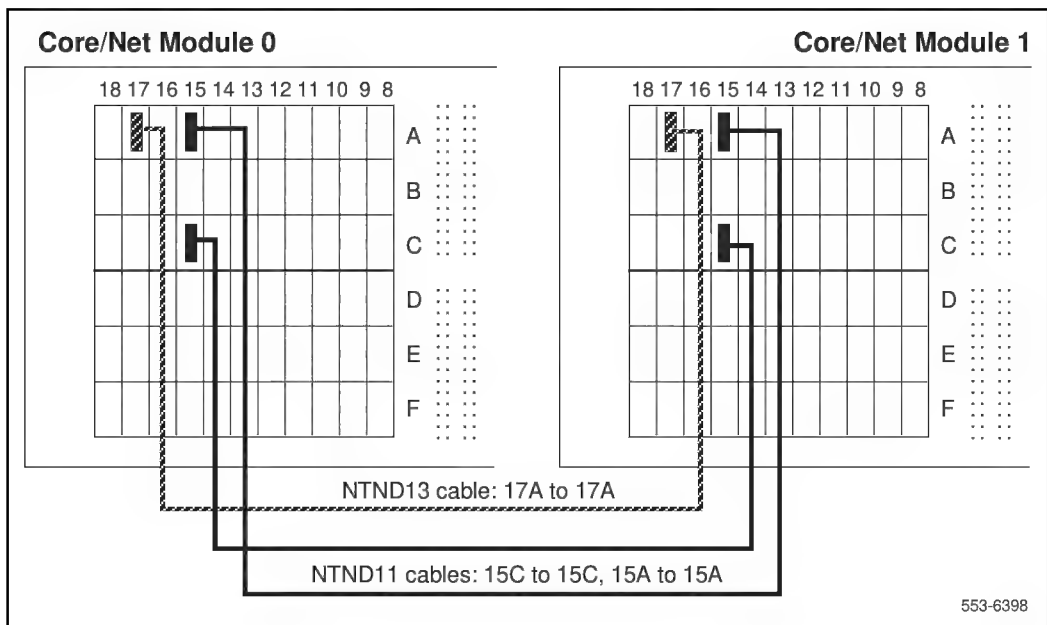
- 3** In the rear of the Core/Net Modules, connect the cables between Core/Net 0 and Core/Net 1 (see [Figure 96](#)):

Note 1: The following cables may already be connected in one of the modules. If so, leave them connected and attach the loose end.

Note 2: The cables must be routed as perpendicular as possible to nearby power cables.

- Connect the NTND13 IOP to IOP SCSI Cable from backplane connector position 17A in Core/Net 0 to backplane connector position 17A in Core/Net 1 (see [Figure 96](#)).
- Connect one NTND11 CP to CP Cable from backplane connector position 15C in Core/Net 0 to backplane connector position 15C in Core/Net 1 (see [Figure 96](#)).
- Connect another NTND11 cable from backplane connector position 15A in Core/Net 0 to backplane connector position 15A in Core/Net 1.
- Reinstall the left I/O panels in both Core/Net Modules. Use and tighten all eight screws.

Figure 96
NT5D21 Core/Net Module (rear)—connections for IOP/CMDU to IOP/CMDU and CP to CP cables



- 4 Connect the clock controller cards in Network Modules to the junctor board in the InterGroup Module (see [Figure 97](#)). Route the cables as shown in [Figure 98](#).
 - Connect an NT8D74 (AE or AF length as needed) from the faceplate connector on the clock controller card in Network group 1, side 0 to connector SCG 0 (J11) in the InterGroup Module.
 - Connect an NT8D74 (AE or AF length as needed) from the faceplate connector on the clock controller card in Network group 1, side 1 to connector SCG 1 (J12) in the InterGroup Module.

For each additional network group:

- Connect an NT8D74 (AE or AF length as needed) from the faceplate connector on the clock controller card in Network group 2 (and each additional group), side 1 to connector SCG 1 (J12) in the InterGroup Module.
- 5 If PRI/DTI cards are equipped in the Core/Net Modules, connect the faceplate cables.

Note: For detailed instructions on PRI/DTI connections, see *ISDN Primary Rate Interface installation* (553-2901-200).

- Connect a QCAD133 cable from connector J4 on the card to the I/O panel.
- Connect an NT8D85 cable from connector J3 on the card to the selected QPC414 Network Card.
- If needed, connect two NT8D79 cables from connectors J1 and J2 on the card to the respective clock controller cards.

Note: Step [6](#) does not apply to the QPC441 3PE card in the Core/Net Module.

Figure 97
NT8D35 Network Module (front)—clock controller card connections

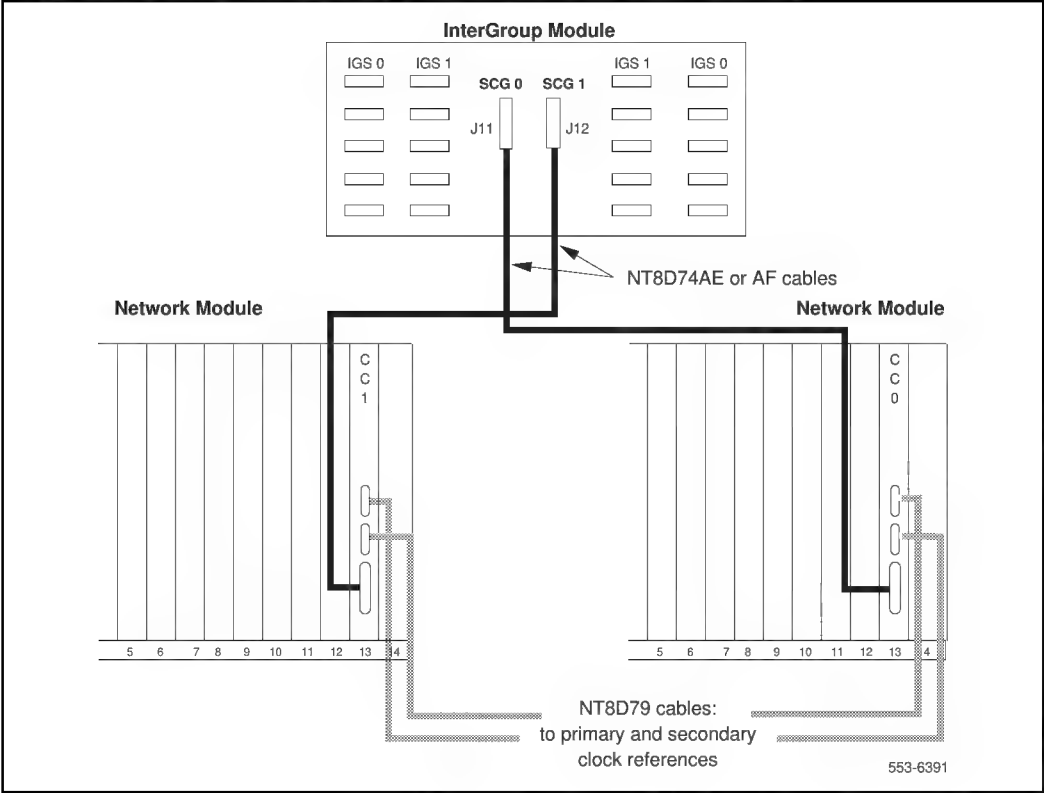
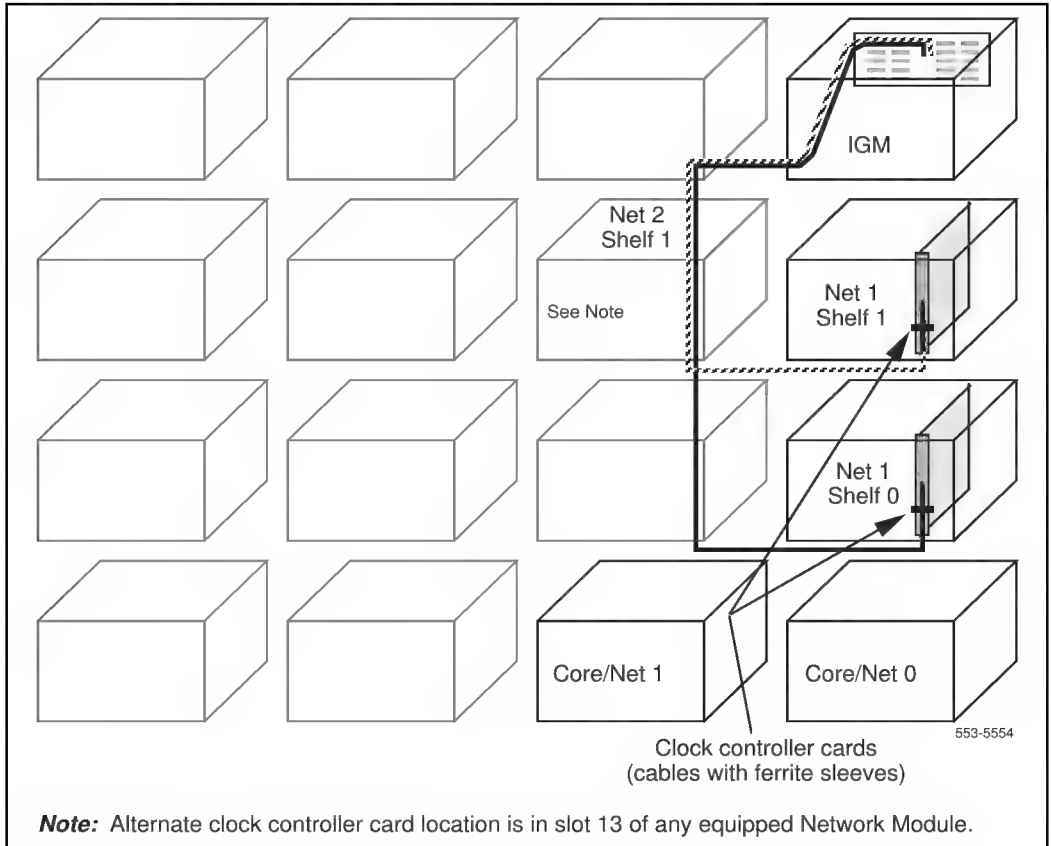


Figure 98
Cable routing from clock controller cards to InterGroup Module



- Connect the NTND14 cable pairs to the QPC441 3PE Cards in the Network Modules. [Tables 22](#) and [23](#) list the CNI to 3PE connections. [Figures 100](#) through [104](#) show the recommended cable routing.

When referencing [Figures 100](#) through [104](#), note where cables are routed. If the figure shows the cable along the right side of the module, route the cable up the right side of the column. If the figure shows the cable along the bottom of the module, route the cable along the front cable trough.

Table 22
CNI to 3PE NTND14 cable connections for Core/Net 1

Cable for Group		Backplane connector on Core/Net 1	3PE card connector on Net Shelf 1
1	connects from	12D	to J3
1		12F	J4
2		13A	J3
2		13C	J4
3		13D	J3
3		13F	J4
4		14A	J3
4		14C	J4
Note: Backplane connections are designated 18 through 12 (from left to right viewed from the back of the module) and A through F (from top to bottom).			

Table 23
CNI to 3PE NTND14 cable connections for Core/Net 0

Cable for Group		Backplane connector on Core/Net 0	3PE card connector on Net Shelf 0
1	connects from	12D	to J3
1		12F	J4
2		13A	J3
2		13C	J4
3		13D	J3
3		13F	J4
4		14A	J3
4		14C	J4

Note: Backplane connections are designated 18 through 12 (from left to right viewed from the back of the module) and A through F (from top to bottom).

- 7 Install cables between the QPC412 InterGroup Switch (IGS) Cards 0 and 1 for each network group and the junctor board in the InterGroup Module.
 - Connect the faceplate connectors on the IGS cards with NT8D76 cables to the InterGroup Module. [Table 24](#) lists the IGS to InterGroup connections and the slots into which the IGS cards are located on each shelf.
 - [Figure 99](#) shows the IGS connection points in the NT8D36 InterGroup Module.
 - [Figures 100](#) through [104](#) show the recommended cable routing.

Table 24
IGS to InterGroup cable assignment—use NT8D76 cables

From				To
Network group	Network shelf	Slot	IGS connector J1	InterGroup connector
0	0 (Core/Net 0)	8	0	J1
0	0(Core/Net 0)	9	1	J6
0	1(Core/Net 1)	9	1	J17
0	1(Core/Net 1)	8	0	J22
1	0	3	0	J2
1	0	2	1	J7
1	1	2	1	J16
1	1	3	0	J21
2	0	3	0	J3
2	0	2	1	J8
2	1	2	1	J15
2	1	3	0	J20
3	0	3	0	J4
3	0	2	1	J9
3	1	2	1	J14
3	1	3	0	J19
4	0	3	0	J5
4	0	2	1	J10
4	1	2	1	J13
4	1	3	0	J18

Figure 99
NT8D36 InterGroup Module—connectors for IGS cards

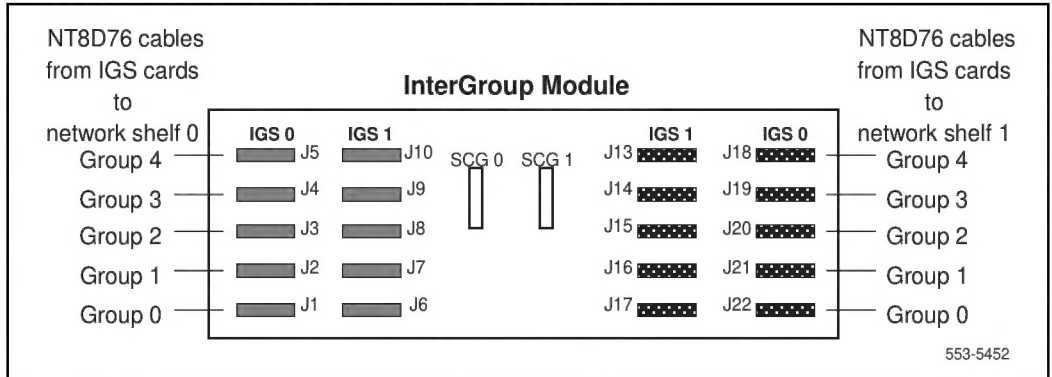


Figure 100
Network Group 0—cable routing to Core/Net and InterGroup Modules

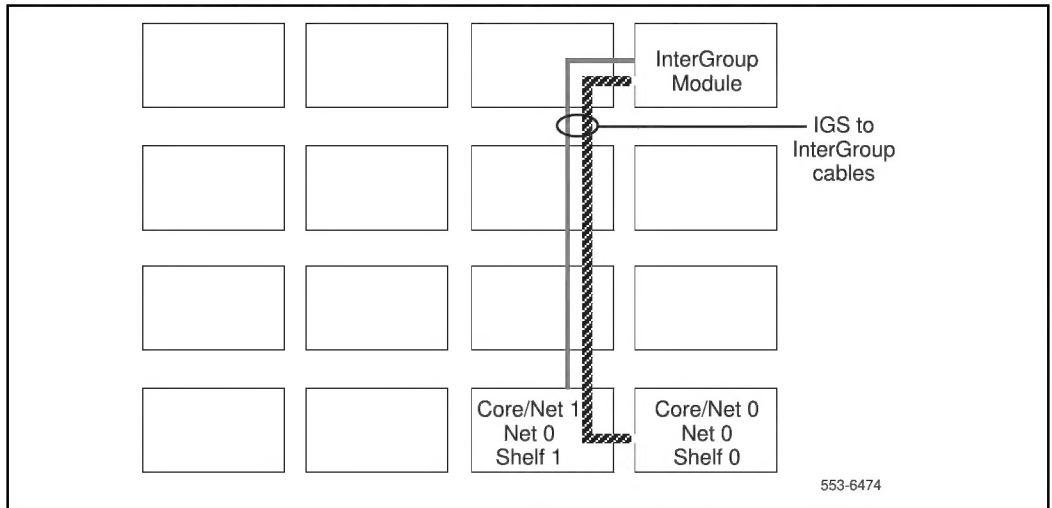


Figure 101
Network Group 1—cable routing to Core/Net and InterGroup Modules

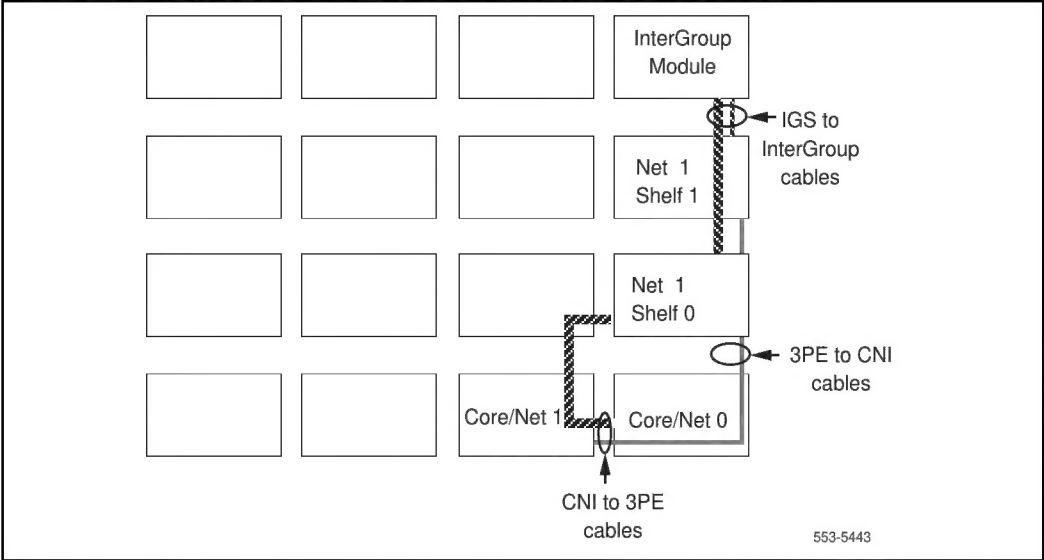


Figure 102
Network Group 2—cable routing to Core/Net and InterGroup Modules

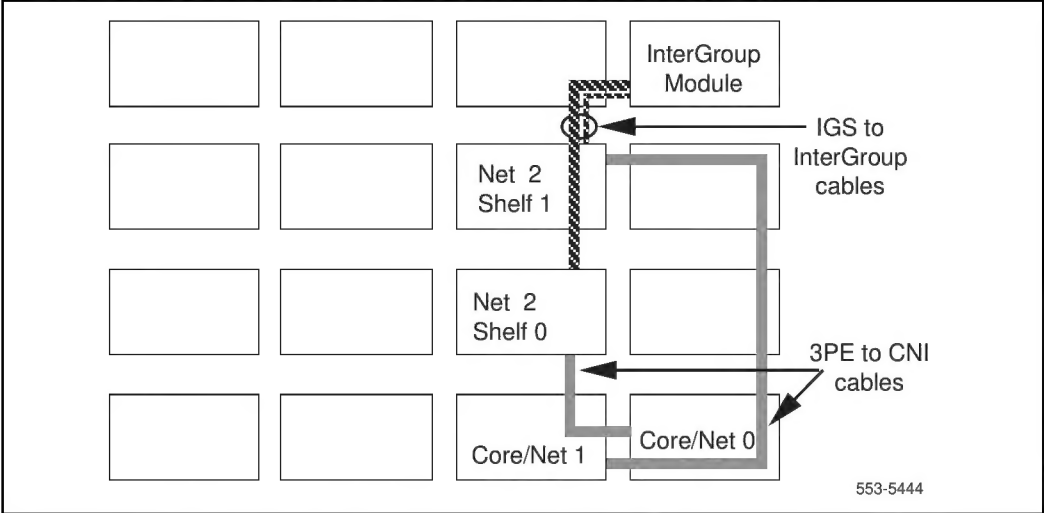
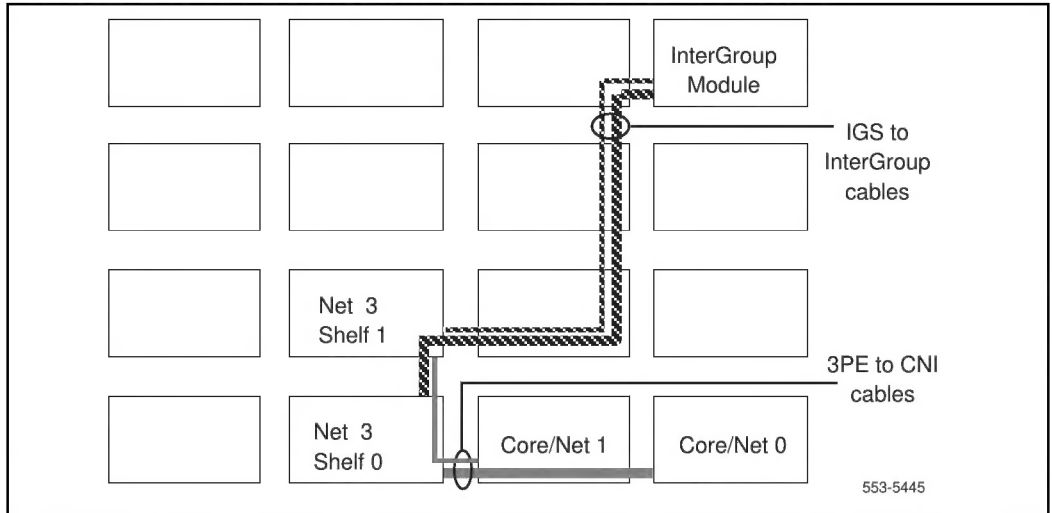
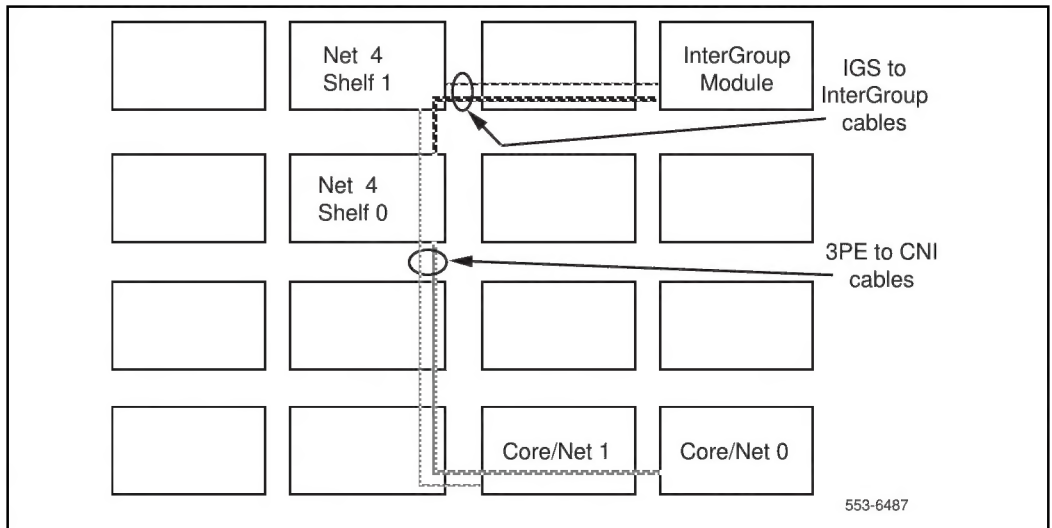


Figure 103**Network Group 3—cable routing to Core/Net and InterGroup Modules****Figure 104****Network Group 4—cable routing to Core/Net and InterGroup Modules**

To secure network group cables with tie-wraps, follow these instructions:

- 1 Tie-wrap to the Core/Net 0 strain relief bracket, all Core/Net 0 CNI to 3PE cables and Core/Net 1 CNI to 3PE cables for groups 0 and 1. The strain relief bracket is located at the bottom of the right-hand-side I/O panel of the Core/Net 0 Module, as viewed from the rear of the module.
- 2 Tie-wrap to the Core/Net 1 strain relief bracket, Core/Net 1 CNI to 3PE cables for network groups 2, 3, and 4. The strain relief bracket is located at the bottom of the right-hand-side I/O panel of the Core/Net 1 Module, as viewed from the rear of the module.

Figure 105 shows the NT5D21 Core/Network Module backplane connectors D and E, which connect the backplane connectors D and E on the other Core/Network module respectively. These connectors are used when configuring the network group in the Core/Network Modules for a dual CPU system.

Figure 105
NT5D21 Core/Network Module (rear view)—location of D and E connectors

